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WHITE LIGHTNING



# WHITE LIGHTNING

*By*

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*Etc.*

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The thunderbolts were imprisoned in crucibled crystalline ore,  
And locked in the laughing ocean, and shut in the shining shore,  
And lulled in the light of evening, and hushed in gentle grain  
And unimperiled lilies impearled with quiet rain.  
A world of woven lightning, incredible, unguessed,  
Where we saw an Easter lily, and Raphael saw the rest.

—The Ballad of Ryerson.

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## Chapter 1. Hydrogen

An auburn-haired boy of twelve stood looking in at the door of a blacksmith shop and wondering why the smith sprinkled water on the fire. He stood with two girls and had an arm around each, but for the moment he had forgotten them both.

There have always been smithies, and children coming home from school have loved to look in at the open door, and doubtless there has been many a lad of whom the girls were so fond that they were willing to stand like tame fillies while he gazed into the shop like a wondering colt.

In such cases the young spectators were fascinated by the brawny courage of the smith, and by the danger of the sparks, but few would conclude that water will burn. This boy however did. He noticed that the sprinkling made the red flame sink back into the coals and then emerge whiter and brighter. The fire was certainly feeding on water.

Presently the dazzling bar of iron was withdrawn, and the sparks began to fall at his feet. The girls shrank back, and he laughingly drew them away.

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Now this did not happen in a village but in the city of Chicago, and in the year 1905. Marvin Mahan was the third son of Chase Mahan, a mining engineer who was oftener away from home than at home. On this May afternoon, however, he happened not only to be in Chicago but to be engaged in writing letters in his den, which held minerals and chemicals and included most of the top story of an old house on the north side.

There the small boy easily found him. The afternoon sun was pouring through an open window on many a mineral of which Marvin already knew the name, but off in a corner a beam of it was running along a table on which lay a sieve of phosphor bronze. The boy stopped and gazed at that sieve.

"Well, son?"

"I'm looking at your rainbows."

Marvin went over and slowly tilted the sieve toward the beam of light. The wires were pretty close together, about three hundred to the inch, and at an angle of thirty degrees the space between them was less than the diameter of the wire. Marvin raised and lowered the slope till suddenly a perfect spectrum of solar light appeared, and he turned grinningly toward his father.

Chase nodded and smiled.

"Some day, when I'm not making so much useless money, I'll write a little paper about that. You have put your finger on a new way of measuring light-waves. But what the devil are you doing up here when you ought to be out with your nine?"

"I want to know what part of water burns?"

"Do you mean is burned?"

"Yes, dad."

"Hydrogen."

"Can I make some?"

"You can't make anything. All you can do is to discover things that God Almighty put in the earth, and you are damned lucky if you can do that. I ought not to teach you to swear, but this letter I'm writing is to a self-made man who rather needs to be sworn at."

"Aren't you a self-made man, dad?"

"No! I came to this town bare-footed, but it's only by the grace of God that I'm not in jail. You'll be doing well if you keep out of jail yourself."

"I will, dad, but can I turn some hydrogen loose?"

"Do you want to blow a hand off?"

"I don't mind, if I can see how the meat looks."

"Then go and ask Norah for a marmalade jar. Get a glass one, and wash the cork."

Marvin was off like a flash.

Chase rose and paced the room, thinking about his children and thanking God they were no worse than they were. Every one of them except Helen was likely to pay dearly for the energy inherited from his own restless self. Augustus however was safely married without any serious explosion so far. Charles had not yet been expelled from college. Helen—sweet flower—was safe in her grave. Baby Anita was for the moment safe down stairs in her mother's arms. But Marvin—this lovable

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twelve-year-old dare-devil—this imp of bottled lightning—what of him?

Marvin's worst escapade thus far had been to lead his tender gang into a saloon and coax enough beer out of a law-abiding spigot to scandalize nine of the best families of the north side. That baseball team did not exactly go home drunk, but they all went home late, having slept off the beer on the lake shore.

His usual and lesser crime was to do all the arithmetic for the bunch and so gain time for sport. He had been punished in school and out of school for this misdemeanor, but he would never promise not to repeat it. What could a teacher say to a beautiful boy who smiled into her eyes and declared it "anti-social" not to help the other kids!

Marvin led everything and apparently had no desire to lead anything. He led because his brain was a little quicker, his foot a little swifter, his eye a little surer than those of any mate. He was the undisputed cockerel of the walk. As for girls—only God knew what he might be guilty of in the course of the next ten years.

Chase lamented that his own energy seemed so little tempered in Marvin by the mother's steadiness. It was only in fits of abstraction that Marvin looked like the Helen Marvin whom Chase had loved these five and twenty years. The boy had some of the makings of a scientific genius—the quickness and accuracy of observation, the mathematical power, the swift intuition—but he seemed to lack the power of quiescence which permits a real genius to brood doggedly on a single problem.

Presently Marvin bounded up the steps, balancing the glass jar, with some water in it, on the back of his left hand. Chase explained that the process of separating water into two gases is electrical, and that the simplest way to get a current is to bring zinc and sulphuric acid together in the water. He said that both materials could be found in the room, and having said it returned to his writing.

There stood Marvin, left to his own devices, permitted to blow his eyes out if he so desired.

He rolled up a strip of zinc, dropped it into the water, and corked the jar. Then he punched a hole and inserted a small glass funnel to let the sulphuric in. It stood to reason that there should be another hole and a pipe to let the hydrogen out. He punched a second hole and inserted a piece of glass tubing.

So far, so good. It was the first time he had been allowed to monkey with the wonderful things in that corner of the den. He took down the bottle of sulphuric and pondered. If anything went wrong, dad would never let him try it again. If the acid made the water bubble and the hydrogen come out of the tube, would it be safe to light it like a gas jet? No, because there was no pressure and the flame would backfire into the jar.

He removed the tube and bent it in the flame of a bunsen burner. He thrust the short end back through the cork and ducked the other end into a bowl of water. Then he poured in a little acid and watched. Sure enough, bubbles began to rise and the glass grew warm, even hot. Presently corresponding bubbles appeared on the surface of

the bowl. He stirred in a little soap so that he could see them better, and they collected in iridescent masses.

Gosh, he had the stuff, but was it safe to touch it off? He sat down and ran his fingers through his chestnut curls and studied his apparatus. Flame could not possibly backfire through solid water. Hadn't he figured this thing out himself? So he applied a match to the soap bubbles and was rewarded by a delightful fusillade—like a machine gun about a thousand miles away and ten years off.

"Not dead yet, dad."

"No, not yet," smiled Chase Mahan.

### Chapter 2. Helium

Three years passed, and Marvin was in the high school without having blown his eyes out. He was distinctly tamer now, though still afflicted with excess of leisure because his mathematics cost him so little. He always had time for sports, and the boy of fifteen was madly fond of dancing.

That summer his father took him on a long prospecting trip in the wilds of Canada and watched him develop into young manhood. Every morning they had their swim together in the pellucid purity of some lake rarely seen by the eyes of white men. All day long they searched ravine and gully, moving slowly from east to west across the continental formation. Every night they lay by the camp-fire and talked about many things, sometimes about the future. It was agreed that Marvin should be a chemist, but Chase kept drilling it in that early specialization was bad. He had suffered from it all his life, and wanted his boy to go slow.

Near the end of the trip the mining engineer slipped in crossing a slope of rock, and fell. When he arose, his right hand was so useless and painful that he suspected some bones had been broken. The first thing he did on reaching Chicago was to proceed to the hospital and have the swollen hand radiographed. One bone was found to be split,

and the sufferer was led to another room that the hand might be immobilized.

Thus left alone with the X-ray man, Marvin plied him with questions. He so fascinated the radiographer that presently he was rewarded with a mystery even greater than that of the subtle unseen light. He was taken into a dark closet and permitted to peer into a small instrument containing salts of radium.

He saw a flight of stars, a sheaf of rays, a faint fierce sparkling! The heavy metallic radium atom was exploding! It was bombarding a small black screen with cannon flashes!

Instantly the boy inquired why somebody did not capture the power of that explosion and set it to work. He was told that any such achievement was impossible. The show was not affected by heat or cold, and would continue for a thousand years or more till the radium was all used up.

What were those flashes? How could he learn more about them? He must wait till he had enough physics to follow the writings of a man named Rutherford.

He was sorry to wait, but he was glad that some human being was at work on the job. He went home full of wonder and impatience. He never forgot the marvelous show. All through the year he kept seeing those immortal fireflies charging the darkness and wasting energy. He no longer broke the law by helping his mates with their mathematics, but spent extra time each day in reading mathematics beyond the requirements.

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And so his high-school years went by. Athletics and girls, Latin and French and German went far to divert his mind from the mysteries of radium.

It was not until 1911, when he was about to graduate and enter Yale, that he ran on an article by the mysterious Rutherford and found himself able to understand some of it.

He had long since learned that even solid iron is full of spaces, and that within the spaces are minute particles in constant motion. He was now to learn that the minute particles are themselves hollow—that an atom is a central nucleus of positive electricity which holds in its sky one or more moons of negative electricity.

In other words, the cheek of a girl, which feels so smooth to the lips, is really a starry sky full of electric suns and moons. The tension between each sun and its moons is all that keeps the cheek from exploding when you kiss it. And here he had been calling them all “darlin’”! Well, he might have known that girls were composed of electricity. He had often felt it thrilling up his arm.

An atom of hydrogen was one charge of positive electricity balanced by one charge of negative. At least, he guessed that if you could ever get a hydrogen atom off by itself, it could be called a balance. But it was not a perfect balance, for the touch of fire would make the moon slip off and combine with the moons of oxygen in a sharp explosion.

An atom of helium was heavier, as if four positive charges were balanced by four negatives. Rutherford did not tell the young mind just how

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those four positive charges—which would naturally fly apart—were cemented into the nucleus, but Marvin guessed that two of the negatives did the work, leaving two moons in the sky. This balance was very strong. The gas never burns or explodes, and can be pressed into a liquid so cold that it boils far below the point where mercury freezes.

A girl composed entirely of helium would be perfectly neutral, incapable of sending out one flash or thrill. All the girls he knew were composed of flesh and blood, which of course were chemical substances but very far from neutral.

Now at last he understood what those flashes of light from the radium had been and still were, for the bombardment was steadily going on there in the dark corner of the hospital. They were the reflection of helium atoms that had lost two moons and came shooting out of the radium to find them. They would pick up the two missing satellites and again become the quiet inert gas. What bully stuff to put in a balloon, if only there were enough of it!

He wondered just how much electricity lay packed in the nucleus of a radium atom. The nucleus of every atom evidently carried a charge, an excess of positive over negative. He used to go up into the den, from which his father was generally absent, and think about it. He would pick up that old sieve of phosphor bronze and tilt it to an angle of thirty degrees and look at the minerals in the cabinet. If he could only get a spectrum from the positive electricity concealed in the heart of each atom, he could number

the elements from hydrogen up. Just now they went by weights, but ought not cobalt to come before nickel, even if it was heavier? Cobalt was more like iron, and ought to come right after iron.

### Chapter 3. Lithium

He had chosen Yale in the hope of sometime studying under Boltwood, the chemist who first perceived that the metal radium slowly changes into lead. As a mere freshman he presented himself in Dr. Boltwood's office, was sharply questioned, was recognized as being something more than a freshman, and received the smiling suggestion that he master differential equations and vector analysis. This he proceeded to do with delight.

Time slipped along, and as a sophomore he took to reading mineralogy. Now iron, copper, silver, gold, lead, and tungsten are to be found in Connecticut, and on days of leisure Marvin took to roaming among their haunts.

Thus it happened that one afternoon in the spring of 1913 he found himself coming over the hill from Lotteryville to Wickford, and looking down on old orchards that seemed like petalite tipped with pink lithium-mica. The nearest one was just below him, and as he passed it on the way down he saw the gable end of an old mansion.

Also through a window he caught a glimpse of chemical apparatus, and somewhere out of doors he heard a girl practicing vocal scales. He guessed that the mansion had been converted into a school for girls. It was not colonial, but looked as if it had been lifted by magic from some British park and set down here in Connecticut.

Descending to the road which passed before the estate, he perceived that its great yard was filled with sweetbrier. Then he heard the singing voice burst into an aria from an opera that he knew by heart.

Differential equations in the head of a youth do not check his springtime impulses, and at the right moment he answered that impassioned caroling in kind. Straightway a maiden appeared at the gate in the high stone wall. She was a vivid creature, and her rare-ripe beauty surpassed anything he could recall.

"Hello, Carmen."

"Hello, Escamillo. What are you doing so far from home?"

"Looking for trouble, I guess. Don't they let you sing indoors?"

"No, we have wigwams."

"May I come into your wigwam?"

"Too risky. Miss Coggeshall watches us as close as her great-great-something-or-other watched the Injuns when he was governor of Rhode Island."

"What do you call your prison?"

"Eglantine. It was once a pigpen."

"No savvy."

"Why, this was the home of an Englishman named Hogg. Miss Kate uses his gunroom for her office. Are you from New Haven?"

"Yes, darlin'."

"And you don't know Jimmy?"

"Didn't even know he was sick."

"Well, Jimmy is the grandson, and I wish you would look him up. He's a soph, and when he's home he lives in Wickford, and his mother has got

the gout, and he never never brings any Yale men up here. There's sixty of us, Escamillo."

"If I come, will you promise me all the dances for the first evening?"

"I will, sure as my name is Cynthia Flory."

"I'll come, sure as my name is Marvin Mahan."

They prattled over the gate, and the pink of her dark cheek grew deeper. She was like musk and musk-roses. She was like the red flame of lithium.

On his return to New Haven he sought out James Endicott Hogg, whose grandfather had been British, and found him an exceedingly quiet fellow. Jimmy was blond and near-sighted and wore nose-glasses. Jimmy was going to be a mechanical engineer and was already designing safety devices.

The two men were so unlike that they took to each other at once. After the summer vacation they managed to get into one course together, and by the first of the new year they were rooming together. Week-end invitations to Wickford became a regular recurrence in Marvin's life.

Jimmy's widowed mother recognized in the visitor just the sort of influence needed to draw her only son out of his shell. Nothing pleased her more than to see Marvin carry Jimmy off for a dance at Eglantine and bring him back more like other men. She had got but little good out of the old home since she sold it to Kate Coggeshall, and had long felt that it ought at least to serve as an experiment station for Jimmy. He was so utterly guileless in everything but business that he was likely to be ensnared by the first creature who should perceive his earning capacity.

And what of Marvin and Cynthia? All that spring of 1914 they flirted outrageously and were never once summoned to the old gunroom to be lectured. Kate Coggeshall had made the dramatic Cynthia out of nothing—had even taught her the multiplication table before allowing her to plunge into music—and was convinced that these two young folks were but playing parts in an opera.

The judgment was approximately correct, at least for the time being. To Cynthia he was still a sort of Escamillo who had dropped down out of the sky. As for Marvin, he knew that he was playing with fire, but thought himself safe. Cynthia was like the high-frequency electrons which he had learned to handle in the laboratory—the sort which at a pressure of half a million volts will kiss the experimenter's lips without burning them.

There was certainly nothing designing in Cynthia. She might perhaps have thrown her toils about Jimmy, but she was content to call him a stick. She might have gone further and called him stingy, for he was never known to send sweets or flowers to anybody at Eglantine.

In matters touching family pride, however, Jimmy was more liberal. For instance, he subscribed to the expensive Philosophical Magazine because his father and his grandfather had done so before him, back to the time when in England philosophy meant physics.

And it was in Jimmy's house in June of 1914 that Marvin picked up the "Phil. Mag." and read the most important article he had ever read in his life. The author was quite unknown to him—one

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of Rutherford's men who signed himself H. G. J. Moseley. This man was reporting some measurements that he had made by the use of crystal gratings and short rays. He asserted that the method gave a spectrum of two dark lines for each element, and that the frequency of vibration increased definitely, step by step.

Marvin laid down the magazine and reflected. This unknown Moseley had found it—a sure way to determine the amount of electricity concealed in the heart of any atom. In ten years chemistry would be a new science. In much less than that time every chemical element would receive a number indicating the charge on the nucleus.

Moseley had already numbered some thirty elements, beginning with aluminum as 13, and calculating gold at 79.

Marvin ran over a few of the other elements in his mind and guessed the numbers they would bear. Hydrogen would be 1, helium 2, lithium 3, beryllium 4, boron 5, carbon 6, nitrogen 7, oxygen 8. If gold was 79, lead would probably be 82. Think of it—an atom of lead is a small universe of compressed lightning carrying eighty-two electric moons in its sky!

What might not this Moseley accomplish? If radium turns into helium and then into lead, why might not Moseley upset the central balance of lead and let the lightning out again? If a gram of radium emits enough energy to lift five hundred tons a mile high, a gram of disintegrated lead ought to turn every wheel in a great factory!

Marvin dashed up to Jimmy's room, where the taciturn youth was shaving, and explained. He

unfolded a vision of the future. When all the coal was exhausted, power would be supplied by Moseley motors and would so enrich everybody that there would be no cause for war.

Jimmy listened, washed off the lather, rubbed his chin to see if he had missed anything, adjusted his nose-glasses, and politely informed Marvin that he was a damn fool.

All the same, the economical Jimmy proceeded to call up New Haven on long distance and inquire diligently and expensively until he learned who Moseley was. He proved to be a man not yet twenty-six, the son of an Oxford don. The fact seemed to cheer Jimmy immensely. These English lads were thoroughbreds, much better trained in mathematics than most American youths.

From that day the Moseley numbers became the background of Marvin's thinking. They presently proved that there are just ninety-two elements.

And since these numbers filled his mind, intruding on all the affairs of his life with the vision of a new world, perhaps the chapters of this book may be allowed to follow the Moseley order. The names of the elements will usually be irrelevant to the chapters, but not to the subject on which Marvin brooded, and not to the deeper nature of the world we live in.

### Chapter 4. Beryllium

When he went to Boltwood to inquire further about Moseley, he was heartily received. The discoverer of ionium even admitted that it might be possible some day to unlock the energy of lead, and that the thing might come sooner than anybody expected, but that a hundred years was soon. He gladly admitted the inquirer into a course, found him quick and ingenious, praised him for his mathematics, and encouraged him.

But Marvin was eager for quick results, and finally decided to specialize in power production. He would spend his first year of graduate study in New York and try to master fuels. After that he would study hydro-electric.

Naturally however he felt a new curiosity about each element. Number 4, for instance, sprang into life as a definite thing. He made a journey to Haddam and searched for beryl. He found the little mine still producing, and learned that beryllium was slowly finding its way into spark-plugs and aeroplanes, and that the race spends a hundred thousand dollars a year for the pleasure of giving beryl to girls.

From Haddam he carried one very beautiful light-green crystal up to Eglantine, with the intention of giving it to Cynthia. But Cynthia never got it. It went to a new girl, one Gratia Ferry, daughter of Asher, the harvester man, whose great

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factory lay just to the west of Chicago on the road to a village called Warrenville.

She was seventeen and peculiarly difficult to flirt with. How can one flirt with a pearl? She was so sensible, so serious, so lacking in humor that she simply did not know how to play. Exquisitely beautiful, she aroused only the tenderest respect. When he danced with her, his auburn hair vivid above her pale gold, he held her as gingerly as if she were a bit of living Sevres.

It is just as well that he did so, because Cynthia—well, Cynthia's dramatic passion suddenly turned into a real one. Wise young daughters of New England manufacturers looked on with amusement and rather expected tragedy before the end of the year. After Christmas, though Gratia went home for the holidays, it somehow leaked out that the beryl she now appeared with, its pale elegance shining on her white neck above her green *crêpe de chine*, was the gift of Marvin Mahan. They were astonished that her mother would let her accept such a thing from a man to whom she was not engaged. As a matter of fact her mother knew nothing about it.

Spring came on, and nobody suspected how far the passion for slaughter had burned in the German navy. Nobody looked into a beryl, as Rossetti's poor Rose Mary did, and saw murder ahead. When May was white with bloom the *Lusitania* sailed, crowded with women and children, was torpedoed, and sank while the assassin looked on with mingled emotions.

The world received the news with unmingled emotion but not much motion. Asher Ferry was

interviewed and said that the sinking of the Lusitania was undoubtedly a criminal act, but that it was precipitated by her own criminal carelessness, a remark for which Chase Mahan never forgave him. Marvin was impotently enraged. Jimmy apologized for Asher Ferry, and Marvin gave Jimmy credit for judicial balance. There was however no art to read Jimmy's construction in his face. Nobody but his mother perceived that the taciturn youth had fallen deeply and painfully in love.

June came, and Marvin was invited once more to Wickford before his graduation. Appleblooms were past, but Jimmy's mother on the porch looked like a bit of orchard herself, her shawl and hair so white, her thin cheeks so ruddy. She rose and greeted Marvin cordially, but put her hands behind her.

"My knuckles are worse than usual tonight."

"That gives me a perfect excuse," said Marvin, and kissed her.

Jimmy departed to look after his car, and Marvin seated himself.

"Dear lady, you'll not be tried with me any more."

"I can't say that you've been a trial. You do shake hands too warmly sometimes, but you have been good for Jimmy. You have sometimes persuaded him to talk a little."

"Talking isn't Jimmy's long suit. He is going to be a very great mechanical engineer and a very great business manager."

"Marvin, don't gush. He can't possibly be an  
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absent-minded inventor and a wide-awake business man at the same time."

Marvin laughed.

"Jimmy isn't absent-minded. There's always something important going on inside his head."

"Marvin, you admire him now, but there's no telling how long it will last. Your affections are somewhat scattering. Don't you ever think of concentrating them on some sweet girl?"

"On whom, for example?"

"You ought not to ask me that, but an old woman can't help thinking what a superb pair you and Cynthia Flory would make."

"That," laughed Marvin, "would be a good deal like marrying a magnum of extra dry." Then he picked up his bag and inquired, "Same room as usual?"

"Yes, and you may like to know there are other guests for dinner. Miss Coggeshall will be here presently with Gratia and Cynthia."

"Hurray! I mustn't leave Connecticut without kissing the most wonderful teacher that ever lived."

And Marvin departed, singing a Spanish song to the effect that he liked them all, whether dark or fair.

Jimmy presently returned from the garage, removed his glove, and laid his hand upon the swollen knuckles.

"Jimmy, don't."

"I'm not hurting you, mother. I just want you to know that I appreciate something. This is the first time you have asked Gratia to come here."

"Jimmy," said his mother in her even low tone,

"I know what you want. You shall have her, if I can manage it."

Jimmy's fine mask of a face took on lines of asperity.

"The less managing the better."

"That's a pleasant thing to say to me after thanking me for managing this much."

"I don't imagine she has any use for me."

He drew from his pocket a letter, opened it, and laid it lightly on his mother's hand.

Dear Sir:

My daughter has written me a pretty strong recommendation of you. If you come to Chicago as soon as you graduate, I'll give you some sort of a job. My secretary would put it more cautiously, but I am writing this letter myself.

Yours truly,

Asher Ferry.

"Jimmy, this means that she cares for you."

"It means," said Jimmy slowly, "that she doesn't. She doesn't want me bothering her next year."

"My dear, Gratia looks to the future. She wants her father to know you, and I want you to go."

"You will be lonely."

Her thin lips closed tightly, and her thin ruddy cheeks looked squarer.

"It is not of the slightest importance whether I am lonely or not. All I ask is that you will not reproach me with managing."

"You're a dead game sport, mother, but if you will gamble, you must expect to lose."

"Hush—here they come."

It was a surrey that approached. Miss Coggeshall had a motor car, but she rarely used it herself. Her ancestors had not needed such things.

Her man handed her down, and she preceded her charges up the steps trippingly, in spite of her weight.

Jimmy and Marvin presently descended together, a comely pair but different. A few minutes later Jimmy took in the guest of honor, the two beauties followed, and Marvin brought up the rear with the hostess.

"Well," said she when settled in her chair, "we are getting near the scattering time."

"Yes," agreed Kate, "but we shall get together again. Cynthia expects to come east at the holidays, and Gratia is coming back in September."

"Yes, indeed," said Gratia. "Next year I hope you will let me come and see you often. Mother thinks you are awfully good for me. You—"

"Gratia," broke in the hostess, "I love you dearly, and I want you to call me by my name."

Gratia colored delicately, and silently began to eat her clams.

"And where are *you* going to be, Mr. Mahan?"

"In New York, Mrs. Hogg."

"Ah!"

Marvin thought it over. He had suddenly become Mr. Mahan, and evidently was not going to be invited for any more week-ends. Mrs. Hogg was going to prevent him from seeing Gratia.

Cynthia leaned forward in all her richness and showed her knowledge of King Lear, which was recent. "And now our Jimmy joy, although the last, not least, what about you? We want to know, for Gratia is the King of France and I am Burgundy."

All eyes turned from Cynthia to Jimmy, while Marvin felt Burgundy's right hand daringly press his left beneath the table-cloth.

Jimmy took off his spotless glasses and rubbed them.

"I don't imagine I shall get home even at the holidays. Mr. Ferry has been good enough to ask me to come out to Chicago."

"Tip top!" cried Marvin.

"I don't imagine—"

"But you do imagine. You imagine reapers and binders and three-point suspensions all safe for children to play with. When do you leave?"

"As soon after commencement as possible."

"I congratulate you on Gratia's friendship," said Cynthia heartily.

"I had very little to do with it," answered Gratia coldly.—She sat with perfect self-possession, an exquisite girlish figure in a very simple and very expensive white dress.—"All that I did was to write a note. I wrote my father that Jimmy was the best all round man in the class of 1915."

Marvin threw her a kiss across the table. "You did just right! In five years Jimmy will be general manager of the Ferry plant."

Jimmy could always find his tongue when given undue credit. "I'm no mathematician at all when compared with Marvin, and I shall never be manager of the Ferry plant if I live to be a hundred."

Mrs. Hogg cut the mutual admiration short. She lifted her soup spoon and remarked, "I think we need not anticipate. Mr. Ferry is known to be a judge of men."

"He's not a judge of Germans!" cried Cynthia.

Mrs. Hogg pinched the soup spoon with her gouty fingers.

"Cynthia, you are a young girl, and it ill becomes you to criticise a distinguished man of affairs. I abhor the Germans since what happened on the seventh of last month, but I don't believe all that I read in the papers."

A moment of serious silence ensued, and then Mrs. Hogg tempered her rebuke.

"Cynthia, you are carrying off all the honors in music. Won't you play for us after dinner?"

"Of course I will. But it is so warm that you folks had better sit out on the porch. Marvin will turn the leaves for me."

This was exactly what Mrs. Hogg wanted. In due time she led the way to the porch, to one end of which Jimmy immediately carried Gratia off.

Cynthia struck into a polonaise, not caring whether the porch listened or not. In the tumult of the polonaise Mrs. Hogg began calmly to talk to Kate. Her subject was what she called her junk, by which she meant certain securities which had been charged up to profit and loss. One was a stock certificate for some abandoned land in northern Michigan, and she wondered whether the region might not contain minerals. On this point Kate promptly advised her to write to Marvin's father, but the advice was not well received. Mrs. Hogg had no notion of selling anything to an expert who might conceivably get rich out of it.

Meanwhile Cynthia made the most of her last opportunity, while her prey sat there flushed and frowning. She was not playing from scores, but

ran from one thing into another. She would sway toward him, her fingers breathing intoxications. Now she broke into song, softly laving him with ripples of tropical seas or clasping him in mad arias. She played or sang for forty minutes. Then, as he had neither spoken nor touched her, she abruptly arose.

He followed her to the porch.

"Miss Coggeshall, the syringas smell very sweet. Will you ramble with me in the dark?"

Miss Kate dryly complied.

When they were out of earshot, he opened his heart.

"If I should get me a car and drive up here once a week next year, would you come for a drive and bring Miss Ferry?"

The principal of Eglantine laughed. "I know about that beryl. Are you in love with her?"

"Not especially, but I don't enjoy being snubbed."

"But suppose Jimmy—"

"He doesn't."

"How do you know?"

"By living with him. Jimmy's only interest in life is to make safety devices for machinery."

Kate reflected. "I owe everything to Susan Endicott Hogg, and I have a duty toward the Ferrys, but I have some sympathy with young folks."

"Miss Kate, I told Mrs. Hogg that you're the most wonderful teacher that ever lived."

"That will do, Marvin."

"I don't flatter."

"Don't flatter yourself that you don't. For your age, you're the worst I ever knew. But that is just the point. I will write to Mrs. Ferry that the young man amuses Gratia, and that his enthusiasms succeed each other rapidly."

"Miss Kate, I'm so much obliged that I am going to kiss you."

She screamed, for she felt herself lifted clean off her feet. He held her in mid-air, kissed her on the lips, set her down, and received a stinging cuff on the ear.

Gratia Ferry came running. "What in the world is he doing?"

"Kissing me in the dark."

"That's because he wanted to kiss Cynthy. That vampire is after him every minute, and he was just dying to kiss her."

"So I was, and Mrs. Hogg is dying to have you call her by her name."

"It's a horrid name," said Gratia. "She married it, and so she has to make the best of it, but I certainly shan't."

"Shan't what?" cried Marvin.

But Gratia was already gone.

### Chapter 5. Boron

The great factory to which Jimmy had been invited lies to the west of Chicago, and at sunset its multitudinous windows make it look like a low long crystal, flaming.

A few miles west of it lived a woman well known to Susan Endicott Hogg, though they had long been separated. It was a woman who had thrown herself away on a mere professor. In spite of Susan's domineering will, her dearly beloved Winifred had married a pauper nearly twice her own age.

He was, to be sure, an authority on the decline of the Roman Empire. There used to be many such authorities, but the fashion of inquiring why Rome fell has rather gone out. And except for being known to scholars as the editor of the definitive edition of Tacitus, this authority was obscure. He was only Dr. Ambrose Rich, professor in Warrenville College, and sixty-nine years old.

Warrenville College was itself obscure, if for no other reason than that it had never succeeded in lopping off its preparatory department. It was not like the bolts and screws in the Ferry factory, perfectly standardized. And because it was not perfectly standardized it had no share in the Carnegie pension fund or any other pension fund.

Nobody doubted that good work was done in the college, but after all the home folks cared most for the academy.

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The college commencement of 1915 was over, and the bachelors of arts had gone off to forget their Greek, and academy commencement was at hand. The whole village had eaten an early supper, and the mothers were washing the dishes while the daughters were getting into their white muslins.

The young president of the college put on his straw hat and wandered out into the evening. The campus oaks rustled softly. From the little river came the murmur of waters flowing past the ruins of the old mill, the reminder of pioneer days when all the county brought its wheat to Warrenville to be ground.

He wandered down to the mill and discovered there his best friend and most valued counselor. Professor Rich was reclining on the bank of the river. His form had a certain wiry ancient elegance. His thick white hair was like a halo, but his beard was small and his features were small, after the manner of certain old New England families.

"Good evening, doctor."

"Sit down, Mr. President. Heaven has sent you. I am telling you that I have got to quit."

"No, Dr. Rich. You told me that last October, but you never taught better than in the year that has just closed. I simply can't consider a resignation. Your health is good, your spirit is young, and your name is our only glory."

"My dear Charlie, when we elected you president, we did so partly because your manner of speech is so ingratiating. It remains such. You speak me fair and cover my ancient cheeks with

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blushes, but when you open college in October I shall not be here."

"Why?"

"For the same reason that I gave you in October. We are going to be drawn into the war, and I'm too old to stand the strain. I served in one war, but you can't expect a man to pump up the proper amount of hatred at sixty-nine."

"I tell you we are not going to be drawn in."

"Charlie, did my boy's valedictory make so little impression on you?"

"Why, I don't exactly form my political judgments by the opinions of valedictorians."

"But that wrath—Horatio's wrath over the sunken Lusitania—might not that be an index to the American heart?"

"I suppose so. It is barely possible. I'm wondering whether your other valedictorian will follow the same line tonight."

"Charlie, I have no more notion of what Jean will say tonight than if she were not my child."

"Doctor, why didn't you marry till forty-six?"

"Charlie, I don't know much science since Aristotle, but that excellent authority on fish assures us that every event has at least four causes."

"Doctor, you can't throw dust in my eyes by quoting your classics. I'm sure the cause was poverty, and I'm going to say as much to Elbridge Gary and ask him to pension you."

"Charlie, I forbid it. This everlasting begging from men who knew the town as boys has gone far enough. I shall manage. I have some money every year from the text-books and the Tacitus, [30]

and I have my garden, and I have the St. Mary's river with a few fish left in it."

The president mused for a minute, while the DuPage rippled softly, and across it were borne the strains of the academy orchestra rehearsing for the last time.

"You will probably live twenty years more, doctor, and those text-books may not hold out so long. But I'm powerless. It's no use to appeal to Asher Ferry. The last time I went to him he said that he would never do anything for a college. He might, when the time came, endow a laboratory for research, but he had no use for colleges."

"What else could you expect? I never saw the man, but he is the living embodiment of an illiterate age. Now about Jean. I shall wish her to enter college next year."

"You can't wish it more than we do. Let us have her in our own family."

"Will you accept board money?"

"Not a cent. Didn't you lend me the money that put me through?"

"Did I? If so, where did I get it?"

They both laughed.

"Well, she shall be your guest for one year, but after that I shall insist on paying. Now let me thank you for parting with me so gracefully, and let's go and get my Winifred and your Mary, and go and hear the wisdom of triumphant children."

The chapel bell was beginning to ring, and the two men arose.

An hour or so later, after the orchestra and the smiling principal had properly introduced her, up

sprang the valedictorian, Jean Winifred Rich, and thus spake Jean:

"Friends of the class of 1915, it is certainly ridiculous that two valedictorians should come from one family. In fact I guess it is a sort of joke that was played on us. Anyhow the real reason why I was chosen to say good-by was that I remembered a remark of my big brother. One evening last summer we were looking at a star which the Greeks called Phosphor in the morning and Hesperus in the evening, and I said that Venus was a poor name to teach the seniors, because they have all they can do to keep from falling in love, and that Venus is a planet, not a star.

"Horatio answered that the dictionary lets us call any heavenly body of light a star. Then he said that if we were on Venus, the earth would look exactly like Venus, a steady point of white lightning.

"I told this tale at class one day, and they elected me valedictorian right away, with instructions to tell you all that the class of 1915 knows about the earth. They thought that ten minutes would be enough.

"So every evening since then I have been obliged to think about the earth as a star, and sometimes the other members of the class came up to our house and helped me think. All this spring we have been doing it, and the way we did it was to pick up the earth and throw it out into the sky. There it would hang, and we could make it look as small as Venus or as big as the moon. When it was about as big as the moon we loved it very much.

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"The first time all we could see was a great whirling thistledown. It must have been a cloudy evening on the earth, and there were lovely colors along the sunset line where the bright half met the dark half.

"Next evening the thistledown had changed into a soap-bubble half dark and half bright, but all of it as pretty as a rainbow. Little flecks of cloud kept rising from the equator, moving towards the poles, and then returning.

"Next evening the atmosphere had all disappeared, and we saw only the water, just a round whirling jewel, like a turquoise with white poles.

"Next evening we saw the places where the rock showed through. We have learned to call them continents and islands. At first they looked like rough pearl, or like the red earth of the planet Mars, but we soon saw that they were covered with a soft green mist, thicker at the equator and thinner as it spread towards the poles.

"Next evening we studied the green mist. Most of it is leaves, such as lettuce and sequoias, which are coaxed out of the crumbled rock by the sun, but it has veins of pink where leaves have turned into animals. The mist of life was as thin as the bloom on a blueberry, but it was wonderful.

"Hidden in that bloom were little babies so beautiful that they almost make you cry. There were little boys who would die to protect their sisters. There were lovers like Romeo, who didn't have the sense he was born with, but we couldn't help liking him. There were sweet girls like Mr. Hardy's Tess, who was hanged because she couldn't help loving. There were strong men who work

hard all their lives for their families or their countries. There were beautiful old men who tell you important things. There were mothers with faces so radiant that I guess that must be where God shows through.

"But over in Europe we saw a bloody war going on, and none of us could explain it. Some said it was the Kaiser's doing, but at that distance he looked so little that I could not believe it. It seemed to me that they were fighting for food, and I came to the conclusion that if there are more folks than our star can feed comfortably, why, people ought to stop breeding boys to be shot down like rabbits.

"But when the valedictorian talked like this the whole class was ready to mob her. They said she called them rabbits. They said that her dear old father ought to be ashamed of such a spitfire.

"Those of you who heard Horatio last week remember that he thought the United States ought to take a hand in this war. He said that the only way to teach the Germans anything was to explode more nitrogen than they exploded. You see, Horatio has studied chemistry, and I haven't. Just now he is smiling at me from the back of the room, waiting to see what a little ignoramus who doesn't know chemistry is going to say about war.

"Well, I am not going to say anything about it, because it stands to reason that when the war is over, people are going to be hungry. I am glad that my brother has his mind set on farming. I hope he will be a very happy farmer, and that his sons will grow up to be farmers. It seems to me that the world needs farmers a good deal more

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than it needs chemists and electricians. Horatio says that there is enough electricity in the air over any farm to run all the farm machinery. I am not very fond of electricity, because I have seen it strike barns full of green hay, but if Horatio wishes to use it to run his machinery, I have no objection.

"And now the time has come to say good-by. We are very grateful to you, our teachers, for giving us such a good time, and we shall try to remember what you have taught us. And to you, our young friends who come after us, we say, love your star. Love the earth, because it is very beautiful, and try to love all of it. Of course you can't possibly love it all as much as you love the United States of America, and you can't love that wild foreign city called Chicago as much as you love Warrenville, but you can practice loving the earth in general. It looks like white lightning, but it isn't really any such dreadful thing. It is our home."

### Chapter 6. Carbon

At commencement time Marvin's father happened to be in South America, but his mother came on to New Haven, where she met not only Mrs. Hogg and Jimmy, but also Gratia. Her son surprised her by refusing to take a vacation. She therefore returned with him to New York, and saw him settled.

Before she left him she had learned, in the gentle way of mothers, what he had said to Kate Coggeshall, and had given him her check that he might buy a car. She knew him for what he was, masculine, able, and intermittent, and saw that friendship with Gratia would go far to keep him straight.

But he did not soon spend the check. He plunged into the study of carbon, especially the forms that need to be more perfectly carbonized to yield smokeless fuel.

Great is carbon, and deep as the shining sea, and a man may plunge into it without going far. It is only the sixth chapter of electricity, but it holds the patterns of human history. It is the most remarkable of all the elements that unite to make a human body.

To conceive of some bodily actions as electric is not difficult. When you lose your temper and hit a man, the very crack of the bones sounds like a crack of lightning. When you discharge a kiss

that you never meant to discharge, it seems natural to blame your battery. But what divine fingers could shape the lightning into a steady brain and quiet glands?

Yet for a while this miracle was happening in Marvin. His limbs held still while he thought. His glands stored up their treasures unnoticed, or sent them secretly through his blood.

How could he think of Gratia when he was swimming in low-temperature coal-tar, or convincing himself that coal cannot be turned into water gas at the mine? Gratia was sweet—men cannot speak of girls without using that carbonic word—but he had not time to smell even the jasmine of coal-tar, much less its orange blossoms.

What was worse, he found it hard to stick to carbon. His mind kept running ahead. As the avaricious are fascinated by crystals of carbon, so he was fascinated by crystals of ordinary calcite. He could not keep away from a certain laboratory to which new crystal spectrometers were being added for the study of atomic structure.

Grein, the young dean and professor of radio-chemistry, soon found him there, and a real friendship sprang up. Grein found that Marvin not only knew about Moseley but had read Harkins's June article proposing a definite hydrogen-helium theory for the constitution of all atoms. And Marvin seemed to like a man for being overworked and irritable.

In Marvin's room there was a telephone, and one August morning it rang with the sudden pressure of Grein's voice against its carbon granules.

"Come over here, prepared for a shock."

Marvin ran to the laboratory, and Grein handed him a cable message:

Lieutenant Moseley shot through head instantly killed tenth Suvla Bay while telephoning as signal officer.

The look on Marvin's face was ghastly. At last he managed to ejaculate, "Only twenty-seven!"

"Yes," muttered Grein, "and any one of his frequencies was worth more to England than the whole damned British army!"

Marvin's unconscious fingers closed like clenching tools as he dully uttered one word:

"Lead!"

"Exactly. Lead driven through the one brain that really understood lead. Better drop your fuels and study lead."

"No. I'm not in that class."

"Who knows what class you're in? I'm no Boltwood, and I'm too busy to pace you, but I'll see that you have some salts and minerals to work with, and you can have a corner to yourself for the rest of the year."

### Chapter 7. Nitrogen

When Dr. Rich had broken his news to his wife, they both breathed easier. And Mrs. Rich could feel still more relief coming. She had said nothing about her occasional shortness of breath, but she looked forward eagerly to the pure cold air of the north. And now that the college year was over and the faculty scattered, there need be no sadness of a farewell dinner.

There were persons in the faculty who were conscious of nitrogen, but the Riches were not. They were literary and easily deceived. They took their nitrogen as it came, and really thought it was peas and beans and eggs. They never stopped to think that they were constantly inhaling and exhaling nitrogen without brushing a single electron off its surface.

Only Horatio was an exception. He knew the stuff. He was going to raise it as cow-peas and plow it under. He had no farm as yet, but a tenancy had been promised him on the Canadian side of the St. Mary's, and when his folks were all packed up to leave Warrenville forever, he went ahead by train to open the cabin for them.

The rest of the family followed by steamer. The evening was pleasant as they watched the Chicago river widen before them into Lake Michigan. Their first objective was Mackinac island, famous long before the days of railroads, the point

at which three great lakes meet. They lie like a clover leaf, and the cabin of Dr. Rich stood by the channel that connects the uppermost leaflet with the other two.

To change the figure to that which appears in a certain fountain, Lake Superior is a brimming shell from which a spillway leads the water down. The beauty spreads westward into Michigan, and eastward into Huron. Thence it narrows into Erie, drops with a roar and a rainbow into Ontario, and rushes to the sea. The Riches dwelt by the first spillway, which forms part of the boundary between the United States and Canada.

It is called the St. Mary's river, and is perhaps the only waterway along which bear and moose peer from their covert at great steamers going by. No other stream carries so great a tonnage through so wild a country. Iron comes down, and coal goes up, and there are points where a lump of either can be tossed ashore as the great steam barge slips past.

From Mackinac they took a smaller steamer to Sault Sainte Marie, and then retraced their course till they reached a small pier known as Upper Encampment. Here they expected to see Horatio, but saw instead their old Scotch friend, George Gillies, keeper of the lights.

"Why," said Mrs. Rich, "where's Horatio?"

"He gied me the key, and said he was going across the river, hunting."

"But Horatio never hunts out of season."

"Well, now, he might be hunting a cow on his new farm, or he might be hunting berries for your

supper." So said George Gillies, but went away looking grave.

When they entered the log cabin, with its fire of silvery birch crackling cheerfully in the fireplace, Mrs. Rich found a note on the table:

Yes, Dearest,

The gray squirrel has gone a-hunting. He knows how you used to worry when he first carried a gun, but please remember that he never had an accident. He has gone with some of the Canadian boys to Camp Valcartier.

Couldn't help it, mother, and couldn't bear to say good-by. Father will understand. He himself went hunting.

Tell Jeanie I love her and love her star. Please God, we'll unify it by the use of nitrogen, and please God, I'll come back safe.

I hope you will find everything all right at the cabin. I've added some picric acid to the medicine closet in case of burns.

Horatio.

Mother dearest, I love you.

Mrs. Rich sat down on the old haircloth sofa and seemed a little faint. She was smiling bravely, but her lips were so blue that her husband brought her a glass of water with a little brandy in it.

Then she showed him the news.

"I was afraid of it," he said. "I hoped we'd get here before it happened."

Jean seized the note and read it. Then she laid it carefully on the table and knelt beside her mother.

Next morning Dr. Rich had a physician come down from Sault Sainte Marie to see his wife. After that he kept a tiny hypodermic syringe where he could lay a hand on it.

Twin-flowers were faintly blushing on Jean's island, which was called the Duckling, but they faded before any news came from Horatio. Eglantine came and blushed more deeply, bringing his first letter. Horatio wrote of his preparations as if Germans were wild wolves.

Over behind the hill balsams were fragrant in the August sun, unaware that in South America there is another fragrant balsam, named tolu, whence toluene. Hewn out among the balsams lay Dr. Rich's garden, on which he had labored for nearly half a century. In it were sweet peas of every hue, and green peas now ready to eat. The nodules on the roots had stored up nitrogen along with ravishing colors and delicious taste. But little the old soldier suspected that the grandsons of his comrades were taking toluene out of tar, to mix with nitrogen and pack into shrapnel. Nor, when he lovingly surveyed the yellow crystals that his son had left him to soothe the pain of burns, did he suspect that Americans were filling bombs with that stuff and shipping them to France for the ammunition dumps of the Canadian army.

September, and rock-rose shone with goldenrod like ore among the quartz. Then came a letter from France. Horatio had ceased to hate the Germans, but still stuck to his theory of unifying earth by nitrogen. The only way to persuade men that earth is holy was to show them the leveling effect of explosives. The war was pretty terrible, but he thought it much less terrible than might have been expected in an age so scientific.

Jean had seen for a month that there was no returning to college. Her mother needed her, and

she was happy to stay. Studying chemistry was out of the question, but she would perfect herself in Ojibway and she would read Lucretius.

The latter enterprise was quickly accomplished. She who loved her Vergil had no difficulty with the hexameters of the great forerunner of chemistry. It interested her to think of everything as made of atoms, and it was more decent to regard Iphigenia's soul as made of atoms than to cut Iphigenia's throat.

She had dried a lot of blueberries in the Indian fashion, and canned three sorts of berries, and made jelly of choke-cherries. So she sent Horatio a Thanksgiving box of goodies all the way to France.

By way of silent comfort she had received a gift from a young Indian, the Bluebird. It was a collie pup who lacked a name. She dubbed him Agricola, in honor of Julius Agricola, the father-in-law of Tacitus. Agricola understood three languages perfectly, and she thought she'd better teach him Latin.

### Chapter 8. Oxygen

Marvin finally accepted Grein's invitation and abandoned the study of fuels. He was getting nervous about the achievements of German chemists. Those laborious beasts, themselves sixty per cent oxygen, were uniting atmospheric oxygen and nitrogen with alarming results. They had placed the German farmer beyond fear of famine and the German army beyond fear of ammunition shortage. All they needed now to conquer the world was to capture the heat hidden in atomic nuclei. Suppose they should stumble on the secret while studying lead!

Grein was able to supply him with a variety of radioactive minerals, and he plunged into the analysis of them to find out how lead derived from radioactives differs from ordinary lead.

In September he was interrupted by a letter from Jimmy, who wrote that he was spending several months in getting acquainted with the Ferry plant. It was halfway out to a place called Warrenville, which Marvin perhaps knew.

Marvin read the letter with pride. He did not know Warrenville, but he knew Jimmy, and was delighted that Asher Ferry was sizing him up correctly. But Jimmy had not seen Gratia. She and her mother had been out of town all summer, and she had now returned to Eglantine.

Thus reminded, Marvin bought his car and drove out to Wickford. He first went to Mrs.

Hogg, and told her that he was going over to Eglantine to take Miss Coggeshall and Miss Ferry driving. He said that there was plenty of room and that he should feel honored if she would make one of the party. Mrs. Hogg courteously thanked him and remained on her porch.

But at Eglantine his welcome was different. Gratia was greatly pleased that he had bought a car, and knew that he had done so for the purpose of enjoying her company. Thereafter, every Saturday afternoon at four o'clock precisely, she knew that he was turning in through the sweetbrier, smiling and handsome and ready for nonsense unless she mentioned Germans.

Miss Kate always went with them and always sat alone. Gratia did most of the talking. Being good in arithmetic but not so good in college algebra, she saved up puzzles for him. She would read off her problem and wait. Marvin would smile ahead at the autumnal road, perhaps dodge a stray hen, and speak the answer. After that she was ready to discuss the country, and would turn round to ask about the estates. Finally she would tell about her week, and ask him about his own.

She never learned much about his week. He was too busy admiring her hair, which was about the tint of pale nasturtium, with as faint and pure a fragrance. He took delight in the sound of her voice, her dark blue eyes, her grace. She was a constant lesson in refinement, and when he danced with her he knew that this was the right limit of pleasure that he might take in any girl's sweetness before he was married.

The girls of Eglantine presumed to regard this lively friendship as an engagement. They delighted to swarm about Marvin in the hope of embarrassing him, but they never succeeded. His impartial "darlin'" was ready for them all, and beyond that he presumed no further.

Cynthia was back for the holidays, and once more sang to him. This time it was the Liebestod from "Tristan and Isolde," and she put all her soul and all her brand-new New York training into it. She did it so well that she seemed to die before his eyes, note by note her breath resigning. \* He told her he should never forget those marvelous progressions.

After that, in the early months of 1916, Cynthia was no more thought of, and even the delightful companionship with Gratia ceased for a while. He had sought girls as instinctively as a metal seeks the most abundant of the elements, and found them all slightly intoxicating, but none had crumbled him into white sparks.

His love was lead. He was less enchanted by carbon than by her sister, who had sung Moseley to sleep to prevent him from revealing her music to the world. But Marvin, listening in, began to recover that music, thrill on thrill. It seemed to him to advance in close chords like those in which Cynthia had so happily died to him.

To put it less figuratively, he began to suspect that no fewer than ten substances may pass as lead. They are what Soddy had called istopes, or equals in place. The Moseley number for lead is 82, and Soddy had made it clear that at least one radioactive substance deserves that number, and that at

least one inactive lead is lighter than ordinary lead. Marvin now conceived at least three inactive and three active leads, weighing 206, 207, 208, 210, 212, 214. This was maddeningly close to transmuting inactive into active, but he saw no hope of turning the trick. He had to content himself with proving that there really is an inactive lead as light as 206, and after much search and labor he discovered it in a certain Norwegian mineral.

This was getting on, but not fast enough to stop any Germans. They were steadily advancing, preceded by hot lead of weight 207. Well, there was plenty of that sort in Missouri, and he concluded that America ought to do more than sell it to the Allies. She ought to project a little of it, hardened with antimony, herself.

### Chapter 9. Fluorine

The Riches began the winter cozily, in blissful lack of chemical consciousness. It would not greatly have interested Dr. Rich to be told that his teeth contained fluorine, or that the steel of his ax had been smelted by fluorspar, or even that fluorspar had revealed a world beyond the violet rays.

He had a chemistry which answered all his purposes. He got it from a person named Democritus, who, four centuries before Christ, had been so heretical as to believe that all things are made of atoms. Dr. Rich secretly regarded himself as pretty liberal not to wish that the books of Democritus had been burned up. He courageously admitted the general atomicity of things, though of course all atoms were massy, hard, and round. Only one thing did the old doctor reserve from granularity, and that was souls.

At Thanksgiving the Riches were grateful that Horatio, now in the trenches, was alive and had received his box. With them dined their Indian friends, the Red Leaf and the Black Hawk, sister and brother. Their name for Dr. Rich was Mainutung, the Far Hearer, and the friendship dated back half a century. They never questioned him, and he never questioned them. Nevertheless Mainutung often wondered if the Red Leaf had lost a lover in her youth, and she in turn wondered

why he had waited till forty-six before marrying Winifred.

Christmas came, and all reflected with satisfaction that Horatio must have received his second box. Horatio bore a charmed life, and a letter from one of his comrades made out that he bore a charming life as well. The letter told a tale on Horatio. The writer had been with him in a charge, at a time when respirators were still few. Horatio had handed his own mask to his buddie and dashed ahead to a point where the gas was thin and Germans were thick.

In January, 1916, Jean went often on snowshoes to see Ojeeg, the nominal head of the Crane totem, whose little girl was struggling with tuberculosis. In vain she pleaded that he build a separate lodge for Penaycee and give her some air. Ojeeg always shook his head and piled more wood into the stove.

February, and Penaycee was so much worse that Ojeeg reverted to the medical methods of his ancestors. Though he refused to build her a lodge because she would certainly catch a new cold, he secretly brought an old medicine man from Potoganissing, and for him he did build a lodge. It was a temporary thing, but the physician sat inside it and called on the thunder to help the child. Ojeeg and his wife and mother saw the lodge shake violently in answer to prayer. Jean and the Bluebird and the Little Pine could not see the vibration. At all events, Penaycee died the next day.

The aged Father La Hogue had got wind of the performance, and came a long distance to protest. He was in time to help bury Penaycee on the ancestral island called Keego, and before he left the

spot he gave Ojeeg a severe lecture. He should have heeded Miss Rich's advice, which was sound, though it would have been better had she also advised a little tartar emetic. But Ojeeg stood silent. He was through with medicine and priests. He went home from the funeral and got drunk.

Nothing daunted, Jean and the Bluebird built a birch-bark lodge for the Little Pine, who was eleven years old and determined to be a doctor. The first night that the boy slept in it, the Bluebird stood before it with a rifle.

March, and mother was not so well. Two or three times she had spells of faintness, and again the doctor came down from Sault Sainte Marie. This time he found a mitral lesion, and told her husband. Dr. Rich in turn told his daughter. Jean then wanted to do all the work, but was not permitted. It was good for her mother to be mildly occupied.

But Jean did a world of thinking about that mitral lesion. Her favorite place for thought was the Tarpeian Rock, a piece of silica ten feet high that stood on the shore near by, exposed to the light of two thousand million stars.

It had a gracious projection where one could sit with one's foot on the ground, but it also had a gracious ascent, and the long top was smooth except for ripple marks left in the sand some millions of years ago.

Though snow on the St. Mary's is never quite gone till May arrives, Jean kept the top of the Tarpeian swept smooth, and on a March evening she would spread the skin of a black bear on that immemorial seashore. Then she and the dog

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would cuddle down and philosophize. Agricola's philosophy was one of relaxation, but Jean's was the fruit of her valedictory. Her star still hung in the midst of heaven.\* No matter what happened, God would take care of mother.

### Chapter 10. Neon

April came, and though snow still covered most of the soil, the air smelled sweeter. And the noble gas, neon, discovered in the year of Jean's birth, stood apart in the air and watched the earth. It combines with nothing. It is like the Epicurean gods, reclining beside their nectar while the lightning bolts are hurled. And one morning it was undisturbed to see a German bomb, filled with the two commonest metals, powdered, drop from an aeroplane.

Next morning the doctor had gone off early with his sled, leaving the dog at home. Agricola was not wanted along when his master should bring home the new Jersey calf, which he had named Sempronia the moment he bought her.

Mrs. Rich had risen and was planning dinner. She wondered whether Jean might not find some young cowslip leaves large enough to be eaten as greens. Then suddenly she felt faint again, and staggered to the old horsehair sofa in the library.

Jean ran for the hypodermic, and the alkaloid did its work so well that in half an hour the patient was chatting gaily. Nevertheless Jean had to pretend not to be frightened, for she had never seen her mother go white so quickly or gasp so hard.

Mother and daughter had fallen into the habit of calling each other by their Indian names when

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they were alone. Mother was the Young Woman, and Jean the Humming-Bird.

"My Naynokahsee, you are the quickest thing that ever flew for help, but you forgot to take my curl papers down. Suppose Mainutung should come back and find me in curl papers."

"Well," laughed Jean, "if you will lie perfectly still, I'll do it now."

With that she began to loosen the bits of paper and release the locks.

"Did Mainutung love you for your curls?"

"Perhaps so. He loved me in spite of himself. Jean, darling, he had never intended to marry."

"There, Oshki, you mustn't talk."

"But I'm fifty years old, and I think you ought to know. I've always wanted to tell you how we met. He seemed no older than I, his hearing so perfect, his eyes so keen. It was like a flash of lightning through us both—I can feel it yet in my own heart—disarming—"

"There, sweetness, you're panting again."

"Disarming—"

Jean ran for the needle, but it was too late. The gasps were terrible for a minute, the eyes were glazed. Then all was silent as the new life beginning beneath the snow.

"Agricola! Agricola!"

The dog came bounding in from the kitchen.

"Find him, boy!"

She opened the door, and the collie was gone.

It was an hour before her father came—came and found his darlings ready to receive him. Jean had done what a brave girl should do for her mother when the time comes, and there was even

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a spray of fragrant arbor vitae lying on the breast, like a palm of victory.

But why was Ambrose Rich steadied into the house by Ojeeg? And why was it Ojeeg who had to draw the telegram from the pocket of Ambrose Rich?

The other thing had happened too.

Safe in the trenches for six months, under fire and untouched, singing through it all of the good time coming, relieved and on furlough. And then, passing an ammunition dump of the Canadian army, blown into pure ether. A thermite bomb, dropped from an aeroplane, had exploded the mercury fulminate, and Horatio Rich had disappeared from earth. There was no more search for him than for the effects of lightning on the sea.

What sudden release was that, as if a billion years had been reversed and a plangent mass of metal had torn itself loose again, shaking the pillared crystals to the centre of the earth! What waste of sacred stuff that might have planted a Sahara with lentils and sent a cluster of sweet peas to every sick child in Germany!

But all the time the noble gas called neon remained unmoved. Like some quiet-eyed chemist looking down the future, it heard no explosion.

Ambrose Rich knelt for a long time beside the old haircloth sofa, holding the hand that returned no clasp, glad that she had been spared the news, and listening to the stifled sounds from his daughter's bedroom. Alas that keenness of hearing should ever persist in the old!

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### Chapter 11. Sodium

Down by the salt sea Marvin was resuming his drives. He talked to Gratia about the war, and found her agreeing with him. He expressed his conviction that America ought to go in. Though Gratia knew that her father thought otherwise, she told him he was right.

All through the spring of 1916 he waited in vain for signs that Congress would declare war. Then in June came the news that the British commander-in-chief had been killed. Marvin's indignation, which had been growing steadily for a year, reached white heat. It would take thousands of men to make good the loss of one Kitchener, but he determined to be one of them. He would get ready to be sent when the inevitable declaration came.

He ran up to Eglantine that afternoon—to Eglantine all rosy in its mass of flowers. He took her off alone this time. They motored up the hill and then made their way on foot to a hollow beneath a spreading thorn tree. They sat down, and he took her hand. She made no objection, but lifted his left hand and studied it.

"Marvin, you have the quickest, finest left hand that ever was."

"Gratia, I'm going to enlist."

She tightened her clasp on both hands. "You are doing right. I don't care what my father says."

about this war. You are doing right, and I'm proud of you."

"Dear, I shall not see you again till the war is over. May I write?"

"I shall be heartbroken if you don't."

"And will you marry me when I come back?"

"How can I tell? Some day I may have a great responsibility. Father's business must go on after he is gone, and I want to keep it together. Do you love me very much?"

"Gratia, I worship you. I've been too presuming with other girls. I think a man ought to look up to the woman he marries."

She gently drew both hands away.

"We're not a very loving couple, are we? But I'm only nineteen. By the time you get back I may feel very differently. Please ask me then."

### Chapter 12. Magnesium

If ever a girl had need of courage, it was Jean during the spring of 1916, for her father sat by the hour staring at that old haircloth sofa, and sometimes at a tiny gunboat made of wood, a piteous perfect thing that Horatio had whittled out as a child. So she had to do most of the planting herself, and tend the garden until it picked up its green and grew lusty.

But when the day's work was done and the supper dishes were washed, she would steal away to the Tarpeian, and bathe her aching soul in stars. She knew that her mother was safe, but she was trying to make sure that God loved her brother.

The inquiry is an old one. Sisters made it long ago beside the Aegean, looking out from the hill of Pelion and the white Magnesian shore, remembering brothers slain across the sea. And out of sad longings they built up their own hero, the swift-footed Achilles, whose mother tried to hide him from the military draft. She strove to render him invulnerable with holy water and immortal with holy fire. Like all the rest he fell, but they pictured him as living on. He survived in a white island with an immortal girl more fair than the rosy slave he had lost.

Jean was too much of a Christian to believe that there is marriage in heaven, and yet her mind lingered on Achilles safe in the white island at

the mouth of Danube, there married to sweet Iphigenia. Horatio was not like that, but was as the angels, perchance as those who came with Lancelot to the vision of the bishop.

She did not distrust God, for her star still hung in heaven, and God was taking care of it. But had God intended to end the line of the Riches? Horatio had gone to war to help make the world safe for babies, but that meant having no wife and babies himself. This was the thing called sacrifice, and she should have to think about it. She was eighteen now, and some day someone might possibly ask her to marry him.

One very important fact she had to begin with. She knew from her mother's dying lips that up to the age of forty-six her father had not intended to marry. And one June evening she mustered up courage to ask him about that. He merely smiled and said, "I'm very thankful that I married your mother, but can any man say why he's a laggard in love?"

Ambrose Rich was a wise man, but even the wisest make mistakes. He did not know that he was driving his darling to theft. Nor did he miss from his library certain works that he no longer had a use for, such as Malthus on Population.

### Chapter 13. Aluminum

About the time that Jean began to worry concerning population, Marvin was preparing to reduce the population of Germany. He handed in his notes on lead, sold his car, went home, enlisted in the National Guard, broke the news to his mother, and was called by his father a lucky dog.

His regiment pulled out for the border, and there he sweated with the rest throughout July. Near the end of the month the death of Ramsay, the glorious discoverer of helium and neon, reminded him that he was only common clay, and in August he took his examination along with the rest of the common clay.

By Thanksgiving, 1916, he was home again, and next day received his commission. In January of 1917 he was sent to Fort Leavenworth to be trained. In April, when war was declared, he found himself once more en route for the border. But that summer he was transferred to the mobilization camp at Syracuse and made a first lieutenant. After some weeks on the drill ground he was taken off and attached to headquarters.

Once a month he was receiving a nice letter signed "Yours truly, Gratia." He always answered it promptly, and felt very much like a married man. Gratia was his treasure, his sapphire. If she aroused but little passion within him, that

was proper. Marriage, whatever else it is, should be a polite business.

As assistant adjutant, he had opened a telegram from which he inferred that he was to be given a captaincy. He knew what he would do when the regimental adjutant should grant him the choice of rifle or machine gun. He would choose the latter and learn how to deal death by the swath. He desired to send the Germans plenty of lead, as a reminder of what their allies had done to Moseley.

And speaking of lead, he had received a journal containing an article signed by his own name. The busy Grein had printed the notes which announced the new lead. Grein's footnote gave him full credit for independent work, but made it clear that his discovery was a needed corroboration rather than a signal new event, for Richards of Harvard had briefly anticipated him. But Marvin was proud even to be mentioned on the same day with Richards, whose manipulatory skill and immense knowledge of chemical reactions were well known to him, and who was reinforced by such men as Baxter and Fajans.

### Chapter 14. Silicon

Jean had not received any journals about lead, but she knew the look and feel of silica. And she knew that the surface of her star was mostly like that of her island—very hard stuff to make a garden of.

She had been wondering if Horatio's descendants would have got enough to eat. By August, 1917, she had come to the conclusion that they wouldn't. She had decided that an annual net increase of fifteen million human mouths is sure to happen, and that each year the earth will have to produce twenty billion more pounds of food to feed them.

It couldn't be done. She was sure it couldn't. There wasn't enough acreage.

In an old magazine she ran across a statement made in 1898, the year of her birth, by somebody named Crookes, a great chemist, to the effect that by 1931 folks would either have to stop eating wheat or increase the crop by taking nitrogen out of the air. That set her to studying wheat, rice, millet, maize, barley, oats, and rye. Though the farm paper often spoke about the possibilities of plant breeding, she investigated the new Marquis wheat and saw that even that marvel would not go far toward supplying twenty billion pounds.

No, instead of being the last war, it was just the beginning of a desperate struggle for food.

She was glad in her heart that Horatio had died childless.

All the world was beginning to feel the pinch of hunger—all except America, which had forgotten how cheap food used to be. She had heard her father tell of his first trip on a Long Island Sound steamer, back in 1856. He declared upon honor that for half a dollar a gluttonous passenger might eat of beef, lamb, pig, turkey, chicken, duck, goose, wild turkey, prairie chicken, mallard, teal, canvas-back, wild goose, brook trout, bluefish, butterfish, mackerel, oysters, turtle, terrapin, breads, vegetables, jellies, fruits, creams, and ices. No money could buy such a meal in 1917. And after the next war, America would be glad to get what Austria was getting—less than enough to prevent rickets in half the children.

Even near her the game was virtually gone, and she rarely saw deer except in her father's woods. If mankind really put its mind to the task, it could kill off all the remaining wild food in a single year. Just now it was too busy killing off its choicest youths.

From every side the cities were shutting in upon her. Every half hour she saw a steamer pass her island on its way after iron ore to make guns and shells. That was why the patrol boat was so busy. If the enemy could block this channel, the enemy could win the war and then citify every foot of earth. Of course Captain Jack Gillies would not let the Germans block the channel, but he could not prevent Americans from crowding it with steamers. After the war there would be a steady

procession of them, stemming daily and nightly toward the pole.

And some day these straits would be fought for just as the Dardanelles had always been fought for. All this pious chatter about a lasting peace was rubbish, as anybody who had studied geography ought to see.

How much of this pessimism was due to Jean's own poverty is hard to say, but she was in no sense penurious. The little pauper was so friendly with the millions of miles in her star-sown nightly sky that she rarely counted money in less than millions. Some day a steel man would come along and try to buy her island to use for a coaling station. Well, he couldn't have it, not for a million dollars.

Chapter 15. Phosphorus

The last day of 1917 came, but she did not attend the grange party to see the old year out. At nine o'clock she lighted her candle, wished daddy a happy New Year, and went to bed.

She awoke long before daylight, and wondered what the new year would bring. Perhaps her father would slip away and leave her all alone. The thought was intolerable, and she sprang out of bed. It was far too early to get breakfast, but she dressed herself warmly and went out.

The frosty sky was more glorious than ever. It bore no trace of a new year, for it was timeless. She looked for Venus, and found it, a great jewel reflecting the purest white. Then she remembered that in her valedictory she had referred to it as Phosphor and Hesperus.

How often since then she had quoted Sappho in her heart, wishing that Hesperus might bring the child home to its mother. But she remembered avoiding the word Lucifer. It meant the same as Phosphor, but she had been afraid that some bad boy might be reminded of the devil. •

Why was Lucifer a name of reproach? Because he tried to equal God. And when defeated he whispered to God's innocents that they were naked, and sent them a boy who killed his brother!

She remembered that her father as a sharpshooter had slain forty of his own brothers—the

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notches were still to be seen on his old rifle. She suddenly understood why he had not married till forty-six. Ambrose Rich had come out of the army determined to engender no boys to be slain by sharpshooters. That was the secret of his traveling away off up here and staying for half of every year from 1869 to 1892. Here he had silently atoned for his sin. Here he had edited the most severe of all criticisms of civilization.

On the whole she was sorry that father had not stuck to his resolution. She was glad to have been born, but as for Horatio, it was clearly a mistake to summon him out of some evening star to be blown to pieces on this one.

For consider what life on earth is. It is a mere stain on the rock, a mist that clings with hands, happy so long as it is stupid. Jean was freed from sentimentality by knowing so much about fish. They would lie still while she skinned them, and she concluded that really normal human beings are almost as free from nerves. She had read of a Zulu so insensitive to pain that when his back brain was cloven by a sword he was laid up for only two days.

And what was the history of civilization on her star? Only those persons survived who could live on very little. The kings of Egypt were gone, but the slaves of Egypt still lived, eating corn and never needing a dentist. In China the slaves ate rice and outlasted all their conquerors. There it was in a nutshell. The earth belonged to people whose teeth would wear down to the root. The earth had always been inherited by the meek, and always would be.

Clearly earth was not a proper place for a superior mind like Horatio's. He ought never to have come. He might better be in the loftiest star of unascended heaven, pinnacled dim in the intense inane. So, on the whole, she would never summon any Horatios down. She would never get married. And when she got over missing her mother and brother, she would be the cheerfulest little old maid in the world.

### Chapter 16. Sulphur

On that same first day of 1918, Lieutenant Mahan was commanding a machine gun company composed of men chosen by himself. Down in Carolina he had picked them for their sinews and their eyesight, not for their language, which sometimes reminded him of the sixteenth element. And a month later he sailed with the advance detachment of the third division.

Once on French soil, he spent March in an American school and April in a quiet sector under French supervision. On the first day of May his new commission arrived, and he became Captain Mahan.

It was clear by this time that he had the knack of command, but of all his men none was so devoted to him as his Indian orderly, O. Fisher. With equal coolness the young brave would polish his shoes or call him a blind Bwan. By Bwan he meant a Sioux, a contemptible weakling. His captain was a blind Bwan whenever he could not see as far as O. Fisher, which was often.

It was no use to discipline O. Fisher. He was an enlisted man, and knew his rights. He recognized the competency of the medicine men in Washington to declare war, but he was quite sure of his own right to go or stay according as they furnished him, or failed to furnish him, a decent chief. So far as O. Fisher could see, Captain Mahan was the only man in the army worth follow-

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ing, for the rest had all been brought up within doors. He paid small attention to Lieutenant Gregg, because Gregg thought that Fisher meant a fisherman, whereas it meant an animal as retiring as a fox and sometimes as fierce as a weasel.

The first of June came, and with it marching orders. They proceeded to the vicinity of Mezy, on the southern bank of the Marne east of Chateau-Thierry. That evening Marvin explained to his orderly what it was all about. A Sioux named Ludendorf was driving at Paris, the city where the girl kissed O. Fisher, and was now within fifty miles of it. The Bwan's advancing line was forty miles long and noisy. It had got as far as the river, but must get no farther.

O. Fisher listened with interest. He sat there on the straw in the dugout, holding a shoe and a brush. His head was thrown back, and there was a deep vertical line between the eyebrows.

"How would you like to be my guide?"

"I am," said O. Fisher, whose memory for the sacred word "sir" was none of the best.

"No, if you act as guide you will not have to shine shoes."

O. Fisher scorned to reply, and resumed his labors.

"Very well, then. Tomorrow you can begin to get acquainted with this terrain. Some day I shall ask you whether you can find a clump of trees in the night."

For a month the Thirty-eighth lay near Mezy. Marvin's company was finally stationed close to the village, on the brow of a hill overlooking the river. Just below it was the railroad that runs

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along the southern bank, and to the left was the brook called Surmeiin.

In the middle of July the regiment got its chance. Soon after midnight on the morning of the fifteenth the German guns began to pound in earnest. Marvin's company awoke and got into position. O. Fisher was stationed in a tree to note what was going to happen.

He knew where the northern bank ought to be, and there he fixed his gaze. Before dawn he saw something moving. The enemy was launching boats. He slipped down, reported, and was ordered back. The dawn came up through cannon smoke, but he was used to forest fires. He saw boat after boat put out, and one destroyed by a shot. He saw two get across, only to be met by grenade and bayonet. But still they came, as if all the wolves on earth were swimming across. The American boys on the southern shore were caught by the throat and clawed down into the mud. Countless Germans blurred with smoke were taking open formation the minute they landed. They streamed into the valley of the Surmelin.

They started up the hill. O. Fisher gave the signal, Marvin gave the command, and they were met by a river of lead. It flashed through brains and entrails, and fell to the earth with its energy unexplored.

It is recorded in books and graves how the Thirty-eighth received the numbers. Foch knew they would be overwhelming, but he proposed to draw the string of the bag.

Meantime the Yanks were swept back from their first positions, but they killed as they went, and

captured six hundred. Marvin fell back on the little village of Connigis. His men buried such dead as they had been able to bring away, and lay down on the ground to get their breath.

But it was only a breathing spell that they wanted. Their oxygen and their adrenals were working to overcome the acid of fatigue. Their sinews were tough with drill, and their palms hard with sulphur. Furthermore there was enough sulphur in their thoughts to insulate them from all pity.

Consequently that night Marvin went over and stood in the mud with his colonel and secured permission to reconnoiter for a new position. Towards morning he roused Gregg and Fisher, and the three of them warmed themselves with hot coffee.

### Chapter 17. Chlorine

Captain, lieutenant, and guide slipped out of camp and struck into the road that leads northward along the brook. The high ground to the right was dim with yesterday's smoke. A mill was burning with spectral blue flames, and the underbrush reeked of gas.

The Germans had brought chlorine because they had more than they needed to bleach cotton. Not twenty men on earth were thinking seriously about the chlorine atom. Marvin believed it to be a mixture of two masses, and considered the fact important.

Beside the road was a dry ditch that presently revealed a straggler lying asleep. The lad had discarded his hot wool blouse, and the morning was so cool that Marvin thought he would step down and wrap it around the sleeper. But when he descended he saw there was no need. Nothing would ever warm that sweet-faced American boy again. He removed one of the identification tags and lingered a minute. It was piteous that this beautiful thing had to be buried, but he was not sorry that it had been born.

After a while the guide made them stop, while he proceeded up the hill. When he neared the crest he wormed his way on his stomach till his nose was over the top. Presently he beckoned to them, and the officers worked their way up and lay at

his right. They perceived that the road to the north was pitted with craters.

"Well, Mr. Gregg, you see what the road looks like. This is about as far as we can get with our transportation tonight. It will save time to carry from here."

"You will have the train stay here, sir?"

"No, we'll let it go back to the woods west of Connigis, where it was before the last move. But we'll unload the ammunition carts and establish a dump. We have plenty of spare guns."

"Nobody left to man them, sir."

"No, but we won't mount them—just keep them here for replacement, and leave a loading detail. Better use that clump of trees down there in the dark. What are they, Fisher?"

"Aja-wee-mig."

"O. Fisher, when in France better talk American."

"Beech, sir."

"Well, do you think you could find those beeches in the dark?"

The promised question had been asked, and they grinned at each other.

"Best of scouts, I want you to write a letter home to your folks before tomorrow morning. I don't know where they live, but you do. And I shall want you to bring back a carrying detail for more ammunition as soon as the forward platoons get set. Now let's look for field-pieces."

The glasses revealed no activity in the captured trenches, and no sign of field-pieces. Even O. Fisher's reinforced vision could see nothing wrong. The world was apparently engaged in no other occu-

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pation but farming. There was booming in the distance, but that was as common as thunder.

The sun's disk appeared. Marvin got up and stretched his legs.

"We must be getting on to pick positions. While I think of it, Mr. Gregg, give Taylor all the men you can spare so that he can have some hot slum here in time to go up with Fisher and the ammunition detail. Now from here it is easy to see what our general disposition will be."

The others followed his gaze.

"At last reports, that ridge at the left—" Marvin pointed with his left hand and turned to Gregg. But just then Fisher seemed to strike him a sharp blow on the outstretched hand.

Marvin swayed to the left. Fisher was lying on the ground with his hat off. Marvin stooped to drag him into shelter, but as he did so his own left arm swung forward, and he noted that it resembled a garden hose spouting red. He sank to his knees. Gregg seized the arm and fumbled for his first-aid package. Marvin tried to help him, but his head was getting light; he felt like a drifting leaf. Gregg got the bandage on and two handkerchiefs around the arm above the elbow, and twisted them tight with a stick.

Marvin lay flat on his back, but turned his head to see if he could make out how badly his Indian was hurt. He could see that red was trickling from O. Fisher's mouth, and that it bubbled when he spoke. He could not hear what was said, for within his own ears was the sound of many waters. But he perceived that Gregg was taking out his pencil and notebook. Gregg held the book directly over

O. Fisher's chest until the guide wrote something.

The pencil grew larger until it seemed a tree.

O. Fisher's fingers were slow brown animals making that tree move back and forth. They were trying to ride it down to get at the leaves. . . .

Leaves, more likely straw, like that in the dugout. From one ton of wheat-straw could be produced alcohol equal to forty gallons of gasoline. Of course he did. Why should anybody ask him if he felt better?

He opened his eyes and saw Gregg looking down out of a cloud. He turned his head. This was no hillside, but the dressing station.

He raised himself on his right elbow and saw a form quite covered with a blanket except for the tan shoes. He studied the shoes. The toes did not lie wide apart, but turned in a trifle. That fact had some significance, but he felt too dizzy to say what. So he went to sleep again as if chloroformed.

Gregg returned to the company and took command. When he told the second lieutenants why, he saw that it was no use to attempt to preserve order. In five minutes the whole company was mobbing him, demanding details and receiving them as a personal insult. With oaths unbecoming the young they demanded that they be led back into position, and daylight be damned. They were made to know their place, but early the next morning they exacted reparation for that hand.

### Chapter 18. Argon

Having determined to be an old maid, Jean worked at it as hard as she knew how. All the conditions were favorable. She came of the oldest New England stock, and nobody can deny that there have been old maids in New England—old maids both wise and charming. So Jean shunned men and cherished her dog, who was dearer to her than all the tomcats on earth, which is the third planet from the middle.

Shunning men in the wilderness is no great effort, especially where the youngest have departed for France. In fact there was one whom she did not shun at all. She found him all alone on the pier, motherless, sisterless, waiting for the boat. He had never been on a railroad in his life, yet here he was, drafted, and going abroad to be shot at. So she kissed him good-by and did not count that one. He wistfully hung over the rail as the boat started, and she kissed him again, and did not count that one either.

Though no man came to woo her, she did not lull herself into security. A prince might come—a young lumber prince to buy her pines. A baron might come—a fat one from Pittsburg, to steal her kisses and her island. She would be ready for them, as inert as a nun.

One soldier had borne away her kisses, and she was not complaining that hundreds had borne away her money. The college boys who formerly

bought her father's text-books had all gone off to France, leaving the royalties to drop to almost nothing. She did not mind, but patched her father's clothes neatly, patched her old white sweater, and patched out her bill of fare with whatever the woods and waters yielded.

And one day late in June, 1918, when a white and gold yacht came to anchor beside her island, and the steward came ashore for milk and cream, she gave him of Sempronia's best without charge. Then, guessing from the name "Gratia" on the prow that there were ladies aboard, she added an armful of early lilacs.

After supper the courtesies were acknowledged by two ladies in person. The younger, who was about a year older than she, seemed to her the most exquisite creature she had beheld—so graceful, so self-possessed, with a skin like petals of eglantine and eyes like petals of gentian.

There sat her father wearing patches, and here sat the callers wearing furs. The mother's peltries, though Jean did not know it, were Russian sables. But Jean had seen silver foxes before. A boy across the river had caught two on Horatio's farm and sold them for a thousand dollars, which was twice as much money as her father was now receiving annually. So when Jean saw that the girl's coat contained two pelts of silver fox, she fell quiet. She was as quiet as a mouse or despair or murder.

"It was very sweet of you," said the older woman, "to send us the lilacs. Ours in Wetumpka were gone a month ago."

"Ours," said Jean, keeping unflickering eyes on the silver fox, "are earlier than usual."

And now the beautiful creature within the silver fox said something.

"There seem to be lots of queer flies on the water. They light on everything, and they have threads for tails."

"Yes."

"What do you call them?"

"Shad-flies."

"I love shad. Do you suppose our crew could catch us some?"

Of all the ignorant and ridiculous things ever said about the St. Mary's this was the worst, but it moved no laughter in Jean. She simply kept looking at that silver fox, as if it had been Medusa turning her to stone.

"My dear young lady," said Ambrose Rich, "the shad, which the Romans were wont to call the little silver shield, is a migrating herring which would be glad enough to visit this river if it had the strength. Eels do come. They travel all the way from their birthplace in the Sargasso sea and arrive here when only a few inches long, but they are too round to jump after flies. Your crew can easily catch herring, however, and I will go down with you now and show them how."

"Thank you so much, Mr.—"

"My name is Rich."

"And ours is Ferry. We have been having a lovely cruise. Did you notice how green the sky was last evening?"

"My daughter noticed it. The Indians too would notice it. They note the difference between green

and blue much better than their forefathers did. Few Indians were able to perceive blue, and few had a name for it."

"How curious! Well, I brought along this little package, and hope you will kindly accept it as—as—" She laid the package on the library table.

When the callers had departed, the gift lay untouched until the doctor opened it and revealed a green sweater of the softest weave. He placed it in his daughter's hands, and she kissed him for it. Next morning however he found it in Agricola's kennel, and deprived the governor of Britain of the most comfortable bed that ever a dog enjoyed.

### Chapter 12. Potassium

Marvin lay in the hospital, trying to realize what had happened to him. Never again could he hope to stir a solution with one hand while he regulated a stopcock with the other. Nor could he see himself making bulbs of laboratory glass, no matter how tough it had been rendered by the nineteenth element.

But presently a cable arrived from his father:

Still a lucky dog      proud of you  
glad to pay for laboratory assistant  
dearest love from all.

The message gave him back his courage. He would not accept a cent. He would teach his right hand to do the work of two, and then apply to Grein for a job. He would do nothing for the rest of his life but study how to blow Berlin off the face of the earth. Nothing but subatomic lightning would teach the Germans anything. They had a natural monopoly of potash, they had mastered nitrogen, they had phosphates the secret of which they owed to a British chemist. Their next war with America would be over dye-stuffs.

But wait—he was forgetting Gratia. He was probably going to marry Gratia. He was not exactly in the mood to do so, but he must remember that she could hardly live on the salary of a laboratory assistant.

Who was this lovely creature, anyhow? He asked the nurse to bring him the letters from his

trunk. There were twenty-four from Gratia, and he read them all.

They were written in a neat round hand, every *i* dotted. They were most friendly. They kept track of him. In the earlier ones there was much about the life at Eglantine. Several concerned boxes that she was sending for his men. She described in pretty detail the commencement of 1917, when she was class president. She described her return to Chicago, her bandage-making, the club for soldiers and sailors, the Waukegan club for the blue-jackets, and so forth and so on. But the letters of the current year were less interesting. She seemed to be running out of subjects. When he had been watching the enemy, she had been watching the sunsets from her father's yacht. Up in the straits of St. Mary a very quiet farm-girl had given her some flowers. She did not seem to realize that he was not concerned with farm-girls.

He spent half an hour in tying those twenty-four letters up again. They were not so fascinating as the job of learning to use his teeth and hand. He let the nurse return the mass of expensive note-paper to his trunk, but would not let her take his mother's letters. Over these he laid a protecting arm, and went to sleep holding them close to his side.

Next day he read those two hundred and was sorry they were so few. She wrote of the boyish delight exhibited by his father on receiving from Dr. Grein a copy of the article on lead. She sent him a solemn parody of the article composed by mother and daughter. She told how his enlistment had stirred his oldest brother, and how August

tus had camped in Washington till he succeeded in getting a job with the Red Cross. She recorded the profanity uttered by his brother Charles when his services at Washington were finally considered more valuable than his probable services in the field. She told of his sister Anita, who was teaching shut-ins to do things that nobody thought they ever could do, and getting them paid for it. Jimmy Hogg was often in for Sunday evening supper, but never had much to say, and wouldn't make love to Anita, though plenty of others did. She thought Jimmy pure gold, but described him as understatement incarnate. She presumed that if he were addressed in a thunder storm to the effect that it was raining, he would say that on the whole he didn't imagine that he was prepared to deny it. In short, as Marvin read and read, he laughed and cried, and was very homesick for his mother.

And then it came over him that he did not long for Gratia. She was sweet and sensible and beautiful, but he did not care two straws if he never saw her again. He had been an idiot to ask her to marry him. It would cost him a good deal to make that proposal again, as he certainly would do. To be the one-handed husband of so elegant a creature was a sorry prospect.

He could see how it all happened. Girls had rather flung themselves at him just because he had chestnut hair, and he had taken refuge in Gratia. Offering himself to Gratia was all mixed up with offering himself to the United States. If he did not grouch about losing a hand, he must not grouch about winning the girl.

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Good-by to all thoughts of radiochemistry. He must get back into fuels and show manufacturers how to stoke. He must even be glad over Gratia, and in due time give her a child.

### Chapter 20 Calcium

Fully prepared to take his medicine, Marvin escaped from the hospital and took account of stock. Somewhere near Mezy his good left hand was depositing its calcium, or was at least on its cheerful deliquescent way to do so. He must get him another, as fine a piece of mechanism as the new alloys of steel could furnish. In fact he must have two, one fit for heavy work. After much investigation he got them made to suit him. One wore a glove, the other was a set of tools. He named the fine gentleman Pat, and the tools Maisie, which was about as near as he could spell Mezy in English.

Long before the armistice he was drilling troops again. And just before it was signed he received a curious note from Gratia. She was glad that the enemy was showing symptoms of collapse, because she hoped that now her friends would treat her better. He did not understand this, and wrote at once to beg for an explanation.

But when, a day or two later, a bundle of papers arrived, it threw light on that sentence of Gratia's. His father had been criticising Asher Ferry.

Chase had been interviewed in Winnipeg, where Ferry's name was well known to the farmers, and the reporter had asked if he were personally known to Mr. Mahan. Chase replied that he had once met Mr. Ferry at a club, but that neither of

them was much of a clubman. Being asked if he did not belong to several clubs, the famous engineer admitted that he did, and humorously inquired if the reporter always went to church. Being asked if Mr. Ferry was a good American, Mr. Mahan flatly declined to discuss the gentleman further.

When back in Chicago, Chase was immediately confronted by a reporter carrying a copy of the Winnipeg interview. He then loosened up. He said that in March, 1917, Ferry attempted to dissuade one of his employees from enlisting, on the ground that the work he was doing was more important than anything he could do as a soldier. The employee nevertheless presented himself at a recruiting station, and was rejected on account of his eyes. Unwilling to accept this decision, because though rather near-sighted he was performing his usual duties as a designer, he applied in vain at another recruiting station. The designer's name would be furnished if necessary, but as the disclosure would doubtless cost him his job, the reporter had better inquire round for other proofs of Ferry's disloyalty.

Marvin laid the paper down. So it was Jimmy who had made all this trouble. Though not much of a letter writer, Jimmy had long since informed his chum of the work he was doing. He was making punch-presses fool-proof. In December, 1916, Mr. Ferry had sent for him and asked him what department appealed to him most, and Jimmy had asked to be allowed to remodel the punch-presses. It would be a slow job to change them all, but it

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ought to be done, because they crushed a good many hands.

Marvin immediately wrote again to Gratia, saying that he now understood the case and thought her father mistaken but not disloyal. He trusted that by June he would be home, and that then she would give him the right to stand by her always. Evidently this letter did not help matters, for it was never answered.

Her silence tempted him. If she would only refuse him, he would feel free to turn again to his first love. And when presently relieved from drilling troops and set to organizing a corps of instructors in mathematics, he was tempted and fell. That is to say, he fell to doing sums.

They led him far, and he found himself grappling with contradictions. The first was the fact that light seems to be an ethereal wave, and yet a bundle of etherless energy. The second was that an atom seems to be a whirling system and yet to vibrate rather than whirl. With these two paradoxes he wrestled mathematically until he felt convinced that the whirling was a reality. As a chemist he would rather see an atom stand still, but as a physicist he was compelled to see it whirl.

He so enjoyed this fall from grace and Gratia that on he went, calculating the mutual electromagnetic mass of a simple system, to find out why hydrogen loses weight when it enters a heavier atom. This was by far the hardest job he had ever undertaken, but it gave him an equation that would always express the total mass of a positive and a negative.

After that he went ahead with two lines of theory, one concerning the interpenetration of elliptical orbits, one predicting the probable varieties of each atomic species. Of course it was all in the dark, but it was the best sort of discipline.

To take an example of his simplest results, he calculated that calcium was forty positives and forty negatives, half of the latter in the sky and half cementing the diminutive sun. Diminutive would seem to be the right word, since it takes six billion billion positives or negatives to make one ampere. Argon, he reckoned, was also forty forty, but its nucleus was more firmly bound, leaving only eighteen planets. Argon was so compact in the middle that nothing could brush an electron off. Calcium, less firmly cemented, would burn in air or join with phosphorus to make bones—like his up at Mezy.

He could see in his mind's eye a laboratory devoted to nothing but these matters—just the testing of these theories by six or eight methods and many new pieces of apparatus. He could see a group of friends keeping at it for years. And other things he fancied. If some lad in his imaginary group chafed under the routine, he might be allowed to explode heavy metals in the hope of securing helium, or coat those metals with radium emanation and then explode them—any device by which the hand of man might chance to deflect the course of nature within the atom. Suppose that the result reduced the estimate of controllable power by one-half, it would nevertheless make America the master of the world, and he believed that she would use such might humanely.

In March he wrote it all out, in a paper of great length, not for publication but to free his mind, and sent it on to Grein.

April came, and earth was called upon to part with Sir William Crookes, who was perhaps the first to suggest that the atoms of earth are of electric origin. Hardly had he read of Sir William's death when Marvin was invaded by the influenza germ. It laid him low, kept him in bed six weeks, and left him with a weakened heart. The man who sailed for home was thin enough to serve for his own radiograph. If Gratia suggested pearl, he suggested a structure of calcium less beautiful.

Chapter 21. Scandium

Late in May, having landed in New York and been granted a month's leave, he went on Sunday morning to call on Dr. Grein. The landlady said the gentleman was not in, that he had called a taxicab and driven off to Riverside Park.

Marvin walked round into the park, surprised that his vigorous friend should need a cab for so short a distance.

The great city seemed to have grown in his absence. Here, where perchance some old Dutch windmill once stood, a steady stream of cars was passing, dangerous to cross. Even the river looked more populous. There came into his mind something that Beers had once quoted at Shef in an effort to civilize the sophomores: "Cities will crowd to its edge in a blacker, incessanter line."

He walked south, stopping occasionally to rest his heart, to where a great tomb of white granite shone, and found Grein sitting near it, with lack-luster eyes. But the meeting was cordial enough. Some spark of ancestral custom awoke in Grein, and he kissed his friend on both cheeks. Then he sat down again, as if his knees refused to function.

"I can't sleep. My hands are cold all the time. I can't remember my appointments. I can't read mathematics. I haven't read the stuff you sent me from France."

"I'm lucky," laughed Marvin, who was handsome in bones, and showed some of them when he laughed.

"Marvin, I'm afraid I shall have to quit."

"No, Dr. Grein."

"But I live in constant fear. Every day I expect that the president will drop in to my office and catch me in an explosion. I can't talk to students. I get enraged over nothing."

And Grein, who never wept, hid his face in his hands and wept like a child.

"There's no cause for worry," said Marvin. "All you need is a month or two at the shore. The war has worn on you. Your father fought with Siegel and was probably as nervous as Siegel in the saddle, but you have had to sit still while I did my best to kill your cousins."

"They are dead," answered Grein. "But I could have stood it if the patriots of this damned city hadn't accused me of lending aid and comfort in the matter of chemicals. I don't need to tell you—"

"No, darlin', you don't."

"But I do! I do! It was a lie—a black, dirty —" and Grein sobbingly exploded into oaths.

Marvin's weak heart was panting with indignant sympathy, but he listened until the smoke cleared away. Then he said,

"Quite so. Did the president stand by you?"

Grein wiped his eyes and looked up at the shining monument.

"Yes, or I'd have shot myself. But how can I go on being dean when I can't control my nerves?"

I'm likely to curse my best friends. If I could only get you here, in line for the deanship!"

Marvin silently held up his left hand.

"That," said Grein, "would make no difference in the office."

"Thank you for saying so, but I'm on my way home to be married, and my wife will need money. That is to say, she won't, but I shall need my self-respect. Grein, don't you need a wife?"

"No," said Grein, once more master of himself, and continued to gaze at the tomb.

It was a hundred and fifty feet high, and ponderous as a pyramid. Within it was a great block of red porphyry, and within that a lead coffin, and within the coffin some clothes and calcium. But the granite around and above all this was not granite; it was a massive will. Sometimes Grein had thought of it as the triumph of northern industry over southern agriculture, but this morning it meant just one thing—that he must fight it out on this line if it took all summer. There must be a way to end not merely one war but all wars.

### Chapter 22. Titanium

A morning or two later the shadow called Marvin reached Chicago. Millions remember how it was in their own homes. Sometimes the whole boy came, sometimes only his shadow, sometimes only a long box. But there was always welcome.

He spent the afternoon lying flat on his back, while father and mother and Anita hovered around for fear his heart would stop beating unless they watched. They brought the telephone to his side and let Augustus talk to him from Duluth. They brought it again and let Charles talk to him from California.

And then after dinner he gave them all the slip—all except his mother. She knew she could not stop him, and so she gave him his latch key, and kissed him, and wished him good luck. An hour later he was in a north shore suburb called Wetumpka.

A taxicab set off with him through a wilderness of private parks and arrived before a lofty pair of wrought iron gates, through which they were admitted by a porter who eyed them narrowly. There was a long winding approach to the house, which was an immense thing, copied after old Moyn's Park, in Essex.

Once arrived before the stone steps, he foolishly dismissed his driver, mounted and rang, gave the

butler three cards, and was ushered into a small reception room.

Presently a tall lean figure appeared, holding the cards close to his dark blue eyes.

"You are not welcome in this house, Mr. Mahan."

Marvin rose, and stood at attention.

"I am sorry, Mr. Ferry. What I wish to know is whether I am unwelcome to Miss Gratia."

"You will not see Gratia."

"Your daughter is of age, sir. I shall certainly see her, and I shall certainly do myself the honor of asking her to become my wife."

"You will do nothing of the sort. But I am sorry that you have lost a hand, and I'll not deny that you look well in your uniform. I don't take much stock in uniforms, but I don't wonder that the girls like to look at you."

Marvin lifted his military cap and settled it on his head.

"What you say concerning your country's uniform is of small weight. Open the door for it."

Asher Ferry turned to summon his butler.

"Take your hand off that button!"

Asher did so.

Once off the steps, Marvin started for the iron gates. But his heart was thumping so hard that he had to sit down on a carved bench in the midst of ghostly bushes. As he sat there, a car from the house passed him. It was slipping away through the night with a note addressed to Chase Mahan, Esq. The note was brought to that person in his study, and read as follows:

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Sir:

I guess your son is about as bad as you are. He has been to my house this evening. He says he is going to ask my daughter to marry him. That won't do.

Yours truly,

Asher Ferry.

The reader's brows drew together, and the long smooth central portion of his countenance settled back within the muscles of his jaw, leaving the lips undisturbed.

He came and laid the note in the hand of his wife, who read it with quiet eyes.

"It is not pleasant, but it was what we had to expect."

"What are we going to do about it?"

"Dearest, I want you to put Asher Ferry under such obligations that he can't refuse to let his daughter marry our boy."

"Does she want to marry him?"

"I don't know. That's Marvin's business."

Chase walked round to the other side of the table and sat down.

"Asher Ferry is worth fifty times as much money as I am. How can I put such a man under obligations?"

"Perhaps you can't. I've seen you accomplish things as if by white magic, but you're no match for Asher Ferry."

Chase snorted.

"He's a damned poltroon."

"That's forcible, dear, but I never heard you speak of iron ore so carelessly."

"Helen, that man is magnetite, or he could never hold thirty thousand men together. But there's a yellow streak in him. There's phosphorus in him,

and titanium. If it weren't for that, he'd be a great idealist."

"I'm sure that's a nice analysis. Now just go into your study and think up some way of turning his yellow streak into idealism. I've heard you say that phosphorus is just the thing for third rails, and that titanium prevents train wrecks, and I certainly wish to prevent wrecking our boy's life. When you hear me sing something, come in and speak to Marvin. By that time you'll have a plan."

Chase obeyed.

About eleven o'clock he heard her begin to play the musical setting of Lamartine's poem, Jocelyn. Then arose the subtly comforting words of the refugee mother to her child.

He came to the door of the study and looked. Marvin had come in, and was leaning on the piano, pale and grave.

The father sauntered forth and stood at the other side of the piano until the song was finished. Then he remarked, "I call that a lullaby that any man might go to sleep to. Anyhow, I'm going, unless the boy wants to sit up."

"I'm not sleepy, sir."

"Then let's hear about your plans. How soon do you expect to be mustered out?"

"It's hard to say, but I presume by the first of July."

"And after that?"

"I have no plans. If you have any sort of job at your disposal, I'll take it."

"Marvin, that's no proper remark for a specialist in carbon. Everything in that group ought to interest you. Carbon, silicon, titanium—"

"Stop there, sir. Send me after titanium, if you know a country where it occurs without admixture of girls."

Chase laughed. "If you'll come back one step in the group, I can use you."

"Silicon dioxide?"

"Precisely. But under sealed orders."

"The less discretion you allow me, the better. Do I go abroad?"

"Later, perhaps, but for the present the St. Mary's river will serve. Are you willing to run up there and buy me some rock?"

"Perfectly willing. How much?"

"Twenty acres, in two parcels, islands preferred."

"How pure?"

"In one parcel it makes no difference. In the other pure enough to be freely acidic. Is it true that the government is dumping TNT into the ocean?"

"Yes, sir."

"Isn't that a waste?"

"Certainly. It's easier to handle than dynamite, and any farmer could be taught to use it."

"Then I'd like some of it."

"You can't get it."

"I'll lay you five hundred dollars that I'll buy fifty thousand pounds at less than ten cents a pound."

"I'll take you."

At this point the mother had something to say.

"Chase Mahan, you ought to be ashamed of yourself. You'd better tell him that if you suc-

ceed, you will pay for a lecture at Yale on the evils of betting."

"Very good. Marvin, if I get that explosive you may draw on me for five hundred and waste it on your alma mater."

"How much am I to pay for the silica?"

"Whatever you think it's worth. Pay somewhere between ten dollars an acre and a thousand. Ten thousand for either island is the upward limit."

### Chapter 23. Vanadium

Having accepted this commission from a sense of his general uselessness, the mutilated man said good-night and went to his room. How carefully comfortable it had been made by loving hands! Even the telephone was there to console him.

So he telephoned a telegram:

Miss Coggeshall, Eglantine, Wickford, Conn.

Home and hungry. Do you know anybody who would invite Gratia and me to dinner?

Marvin.

No sooner had he sent it than he realized its misleading quality. He was hungry in the literal sense, not hungry for Gratia. Language was always spilling over like that. Take the idiotic names of the elements—names of towns, islands, countries, men, colors, goddesses, anything to conceal the one important thing, the number. Nitrogen did not give birth, phosphorus did not carry more light than vanadium, and vanadium was not the goddess of love.

What was a goddess, anyhow, and what was love? Being unable to define either of these obsolete expressions, Marvin went to sleep. The earth turned round and showed again one star that blotted out all the rest. But the electromagnetic sunlight did not awaken him. Nothing did that till the baser elements of his nature were touched—the smell of coffee tickling the tips of receptors in his nose.

He opened his eyes, and saw his beautiful mother standing there with a tray of breakfast.

She set down the tray and handed him a slip of paper which he perceived to be Miss Kate's answer. It read, "She is here, attending her class reunion."

"Mother, I hate to leave all this luxury, but I'm leaving at ten o'clock for Wickford, to ask Gratia to marry me. Her father does not especially approve of me. Should you object to her as a daughter?"

"My dearest, you know I wouldn't. Give her my dearest love as soon as she accepts you."

The day was sweet, and he spent most of it on the observation platform of the swift train. They ran through sun and shower. Now it was a bank of wild pale clover along the track, with nitrifying nodules on the roots and sweet volatile oils swept from every leaf by the cyclone on which he sat. Now it was a field of red clover with virgin bees stealing nectar or carrying male pollen to delicate cold tubes, while overhead the lightning fixed the nitrogen, and rain washed it down to the roots.

He was early to bed above the resonant wheels, but lay thinking about Asher Ferry. It was natural that Asher should object to him, and decent of Asher to be sorry for him, and decent of Asher to open the door and not have him thrown out. That yielding was a sign of strength, even if Asher was a poor judge of cloth. Good judge however of some other things. First man to see the possibilities of vanadium in farm machinery—owed a lot to the resulting lightness. Physically near-sighted, mentally far-sighted. Simple as a child in all that big house. Pacifist because so simple-minded.

Suppose things had gone otherwise. Suppose Asher had smilingly consented, seen them married, given him a laboratory. Never thought of it before. Couldn't have accepted anyhow. Wasn't in love, never had been in love. What was love? Asked that question last night, got no answer, went to sleep—

And at this point, having been just to his enemy, Marvin slept the sleep of the just. Since thought is mostly a series of interruptions, he was interrupted. Since the sun was not pouring into his eyes, his triangular cells began to plump out their nuclei, ready to nerve him for the morrow. And many more such things happened to him, the which no man knoweth.

Next day he turned into the roseate enclosure as of old, and received the unsolicited kiss of the lady who had once cuffed him on the ear. He explained briefly that Asher Ferry had declined to invite him to dinner, perhaps because of the cut of his clothes.

"I see. But you look so pale, so thin, so manly—oh, my dear fellow, I'm sure she can't resist. I'll send her down immediately."

Marvin stepped into his hired car and waited, while his inconsiderate heart thumped against his ribs.

In five minutes she appeared. She wore a blue dress and a close-fitting hat, and was entrancing to look at.

He sprang down to meet her, and she kissed him! This looked bad. Her months of silence had apparently blossomed into love.

He helped her into the car, and off they started as of old.

"Marvin, you look grand in your uniform."

"Thank you, dear. You wore a uniform, too, didn't you?"

"Yes, but it was very plain."

"That's a pretty dress you are wearing. What do you call it?"

This? It's just a cotton voile, and it's out of date."

Out of date or not, that silver blue clung to her slenderness, and the skirt of it had approximately a million pin-tucks. There was a white organdy sash about her dainty middle. A square white collar of the same stuff revealed the petally texture of her neck where it met her body in a sort of dimple.

"Why do you call it out of date?"

"The blue isn't right. Girls are wearing a French blue now, to suggest the uniform of the French soldiers. And pin-tucks are quite out; deep folds are the right thing."

"Well, Gratia, I don't know one goods from another, but I can learn."

She laughed. "Stay all night, and see me this evening in my Veronese green. Tomorrow I'll put on my silk duvetyn because it matches my eyes. Can you guess the color?"

"Midnight blue."

"Wrong. It's gentian."

"Gratia, you get your eyes from your father."

"I know it, and it worries me a little. Do you suppose near-sightedness is hereditary?"

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Something in her anxious tone made him think of Jimmy's eyes. It gave him a ray of hope, but he dared not presume upon it.

"Gratia, I don't know. But if there were myopia in my family and I feared my children would catch it, I'd consult the greatest living authority. I don't feel called upon to name him. I am bound to remind you that the Mahans are not short-sighted. They can see anything at a distance except field-guns."

"Was it a field-gun that robbed you?"

"Yes, I was careless that morning."

"Marvin, you had the finest left hand that ever was."

"Does the loss of it make a difference?"

"Why, not much. You steer remarkably well, considering."

"Thank you, dear. I can't even tie my cravat or wash my hand without help."

He brought the car to a halt at the top of the hill.

"This is where we left the road three years ago. Let's go over and look at the thorn-apple again."

"I'd a little rather not. You'll want me to sit down, and the ground is too damp for this dress."

"Gratia, you are cruel not to give me the right atmosphere for what I am going to say."

"You don't have to say it."

"But I do. Gratia, will you please marry me?"

"I'd rather not, if you don't mind."

"Don't you love me?"

"I can't say that I do."

"Have I offended you?"

"No. Do you love me?"

"No, ma'am."

"Then everything is all right. I'm glad it's over."

They continued their drive, and the sunshine seemed brighter.

"Marvin, your father was simply horrid to my father."

"I know. By the way, it seems that all the trouble started with Jimmy. Tell me about him."

"Why, father has invited him to dinner six times."

"I suppose it's a mark of favor when your father invites a man to dinner. I called on him in the hope of such a favor myself, but he opened the door and showed me out."

"Father opened the door for you! He never did that for Jimmy. Did you tell him you wanted to marry me?"

"No."

"What did you tell him?"

"Why, merely that I intended to ask you. Tell me more about Jimmy."

"Well, father keeps raising his salary."

"Fine! Jimmy is all wool and a yard wide."

"Marvin—"

"Yes, dear."

"Hogs are a yard wide, but they are not woolly."

"Gratia, have I lived to hear you make a joke? I'll act on the suggestion the minute I get back home. Jimmy shall change his name."

"I don't think you are very delicate."

"Well, let's be delicate. Let's go and call on his mother."

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Gratia could not object, but when they approached the little orchard and saw the white shawl on the porch as of yore, she said she would wait in the car.

Marvin ran up the driveway, and kissed Susan Endicott Hogg before she could escape him. Susan however had caught sight of Gratia and was plainly furious. Never in her life had she so felt the need of controlling her temper. But she did control it. She welcomed her unwelcome guest. She told him he was a hero. He assured her that he was no such thing, but only a blind Bwan—a term that he had to explain. She listened to the details, but her mind was obviously on that lost daughter-in-law out in the car.

When the painful interview was over, Marvin carried his lost love back to Eglantine in the highest good humor. They made a stunning pair when they walked into Miss Coggeshall's office.

Miss Kate looked up. Marvin stood with his arm around Gratia, and the pale gold of her beautiful hair was shadowed by the auburn above it.

"Am I to congratulate you?"

"Yes! We're not going to get married."

## Chapter 24. Chromium

Kate looked at them and did not quite believe it. This was just their merry way of putting off their marriage until Marvin had established himself, so as not to be dependent on his father or on Gratia's. Kate had fostered this mating, and took pride in it, and had it all settled in her mind. So she laughed and said she'd wait and see.

Marvin however did not wait for dinner or to see the frock of Veronese green, but tried to heat the chromium out of his ball bearings as he shot back to Wickford. He exulted all the way to New York and went to bed exulting.

Next morning on the Pennsylvania road his elation had cooled down a bit. He was completely depolarized from Gratia, but the reaction was not wholly pleasant. In the first place, the loss of his hand had evidently made a difference. That polite "Not much" of hers concealed a certain physical shrinking and a certain unwillingness to spend a lifetime in tying cravats. Perhaps he had no right to ask any woman to share his mutilated life. In the second place, he felt lost. There was nothing now to prevent him from going to the dogs—nothing to prevent him from indulging his passions and palliating them with the name of nature.

The train reached Philadelphia, where once was signed the only treaty between savages and Christians not ratified by an oath—and the only one, if

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we may believe Voltaire, never broken by Christians. But though little was left of Penn's dream of peace, Marvin remembered gratefully the Quakers in their war work. They had not sent their passions on God's errands or palliated them with God's name.

The train passed on into Pennsylvania, a great and stately volume of natural things in which Penn had desired youth to read. And this youth read a little. To the south and west lay Gettysburg, where a great issue had been fought out. He was not quite sure what the issue was, but it had been very real to his grandfather.

To the south, beyond those hills green as chromium oxide and viridian, lay chromite in the rocks and the streams. There was even a town called Chrome, and he wondered if instead of importing chromite from Africa the steel men were not reviving the old industry. It had taken them two centuries to perceive either the tensile strength of chromium or the intense hardness which pierces armor plate.

Could steel heal the wounds of steel? He had asked himself the question a thousand times, and always with the same answer—yes. Given cheap power instead of this anthracite over which men quarreled and under which they died untimely, machinery would so increase wealth that wars would cease. If all the present wealth were distributed and miraculously kept distributed, it would not raise the standard of life ten percent. But let a hidden nobody in a laboratory discover one new electronic fact—for instance about the

emissions from a heated metal—and everybody was presently enriched.

A nobody—like Richardson or Grein. Grein wouldn't marry. Grein, poor faithful dogged devil, wouldn't marry. Was Grein right or wrong? Grein had already added millions to the general wealth, and women who had never heard of him used his lights by which to compose papers inveighing against men. What Grein needed was a woman to take care of him, a woman who had sense enough to see the importance of science. But there seemed to be few such women. So Marvin concluded, and ended the day with revolt against the whole sex—except one.

Next day that one met him in the hall, threw her arms round his neck, and looked up at him anxiously. He smiled down and answered the silent question.

"She said she'd rather not."

"I'm so sorry. Perhaps she will think better of it."

Marvin's face instantly lost its smile, and looked so grim that it frightened her into protest.

"Don't take it so hard, beloved."

"I'm not taking it hard. I don't care a rap."

She concluded that it was wise to say no more, and so she merely pressed his glove to her cheek and let him go. It is not strange if she misread the situation. Her almost clairvoyant perception was swallowed up in pity.

That night she told her husband.

"It nearly broke my heart. He said that he didn't care, but the look on his face told a different

story. It seems that she treated him lightly—just said she'd rather not."

Chase scowled. "She kept him on the string till she had compared him with all the young men she knew. Then he got maimed, and she had no more use for him."

She came and sat on the arm of his chair.

"Chase, dear, we mustn't jump to conclusions. Don't you remember—thirty-eight years ago—how afraid I was of your fierceness? You had to wait, and you did wait. There was no breaking your will to marry me. Don't you underestimate the tensile strength of your own son?"

"You mean he won't give her up?"

"I don't believe he will."

Chase was silent for some time, lips perfectly quiet, eyes apparently fixed on her silvery hair.

"Helen, do you wish me to go on with my plot against Ferry?"

"Please do. Win him over to our side."

"All right, you witch."

And he lifted her bodily from where she sat, and folded her in his arms.

### Chapter 25. Manganese

Next evening, having been invited to come to dinner and bring some blueprints, Jimmy Hogg quietly expressed his deep delight at his chum's safe return. Three years had confirmed Jimmy's thoroughbred countenance in all its native unmagnetic hardness, but there was faithful friendship hidden there.

After dinner he was invited up to Marvin's room, and there he spread out the patterns of his ponderous upstanding punch-presses. He stood twirling a pencil while Marvin figured out for himself the ingenious device by which Jimmy had stopped the almost daily accidents. The device was simple enough. Jimmy's machines could not be started except by pressing two buttons that stood far apart, and so at the critical moment both hands were removed from danger.

More talk made it clear that James Endicott Hogg, though very modest about it, was on his way to an important departmental managership. It was also clear that he did not believe in profit-sharing, and that he would never admit workmen to the slightest share in administration. He was hard to the point of brittleness.

Yet he was not heartless. Though he could not be driven, he could be led. Though hard, he was ductile—a contradiction in terms till one thinks of a certain steel alloy which can be drawn out but

which cannot be shaped except by grinding. The workman who demanded least consideration from Jimmy would probably receive the most.

But some ductility comes not save by shock, and this is noticeably true of family pride. Having something pretty personal to say to Jimmy, Marvin finally concluded to try the heat and shock method.

"I wish that instead of being named Mahan I had been named Onions."

Jimmy merely lifted his eyebrows.

"Yes, Onions. In France I knew a chap so called, and it proved to be because his forefathers came from Auvergne. There may be other Onions, but doubtless their origin is equally respectable. Now, I am Marvin because my mother was a Marvin, but 'Mahan' means a bear. I say it's an insult."

"The word Mahan," replied Jimmy, "does not mean a bear. It means a friend of mine."

"You are no friend of mine when you flatly contradict me. You are so damned self-satisfied that you have no regard for my feelings. I don't like to be contradicted and I don't like to be called a bear."

"The word Mahan," calmly repeated Jimmy, "does not mean a bear. Neither does Hogg mean a hog. Nobody thinks of the origin of a name."

"Where did your grandfather come from?"

"Hants."

"What was he doing in Hants?"

"Feeding hogs in the New Forest, perhaps. The place is full of acorns, and I daresay his ancestors were swineherds."

"Well, you can't help being a hog-keeper's son, but I don't see why you need boast of it. You're probably wrong, anyhow. If you consulted some philologist, you'd probably learn that Hogg is a French word."

"Hogg is not a French word. If a man doesn't like it, he doesn't have to know me."

"Well, I don't like it. And I'm not the only one who doesn't. Do you wish some day to be called the parent of piglings?"

Jimmy's face grew much pinker than manganous salts. He knew that his friend was only up to his old tricks, but this was pretty raw stuff. It was rotten bad taste to rag a man about his name—just as bad as to ask questions about a mutilated stump. But Jimmy gave voice to none of these sentiments. His heavy jaw was set, his small lips were compressed until he thought of the proper parliamentary phrase.

"Marvin, I suppose we are all descended from serfs, but I'm not responsible for forms of ridicule indulged in by swineherds of the present day."

"James, James, I blush to hear you call your philanthropic employer a swineherd."

"What—" but Jimmy did not finish the question. He remained haughtily and hotly silent until he could once more speak like a gentleman.

"I was not aware that you knew Mr. Ferry."

"I did not until a few days ago. I went to his house to ask his daughter to marry me. He couldn't quite see it, but his manners were not those of a swineherd."

Silence. Jimmy's self control was perfect now, but his wrath was coruscating.

"I saw Gratia later, and she refused me."

Instantly the heat was quenched.

"She refused me because she did not love me. Of course if she loved a man, she'd marry him no matter how impossible a name he bore. I asked her one or two questions about you, and she timidly expressed a wish that hogs were woolly. I don't think you can blame girls for such feelings. They're sensitive, you know."

"Yes," said Jimmy. "Finer organization."

"You bet. Now, wouldn't your mother's name do just as well for you as your father's?"

"I'm not an Endicott, but perhaps I could spell my last name 'Hogue.' Do you think that would please her?"

"I'm sure it would."

### Chapter 26. Iron

Our hero collected a light camping outfit and loitered in town till he was mustered out. His release came on the last day of June, just after the death of the aged Lord Rayleigh, whose beautiful scientific work and beautiful old face had long commanded his reverence. That a baron should have gone over the whole field of physics, re-weighing, clearing up all sorts of uncertainties, seemed to Marvin a proof of the good time coming. He had heard of other English barons, for instance Fortinbras, who were essentially democratic, but Rayleigh bore away the palm from them all. Fortinbras was interested only in navies, but Rayleigh's argon would eventually prove more important than all the navies on earth.

Early in July he went by boat to Mackinac, secured a launch and an engineer, and in three days set foot on every island in the St. Mary's. Most of them lay too far from the channel, but he made note of two, lying about four miles apart, that seemed exactly the thing his father wanted. Who owned them he had as yet no means of knowing.

At Sault Sainte Marie he dismissed the launch and let it find its way home, for he desired no company when he should come to bargain for islands. Also he wanted a launch that he himself could handle.

He would hardly have found it had not the great American people sent it in a curious way. When Marvin had searched the river front in vain and was walking along the stone wall below the locks, idly watching the school of herring pursue a drifting mass of mayflies, an elegant launch cut through the herring and drew up to make fast.

Marvin held out his hand for the rope, and smilingly answered questions. He was invited on board by the youthful owner and was shown how nearly automatic Kittiwake could boast herself to be. Presently the owner cast off again and permitted his new acquaintance to run the launch up to the locks and back again.

Then pleasant facts were revealed. The owner was seeking storage for his craft for three weeks, because he was on his way to Winnipeg to persuade that innocent city to chew his father's sapidilla—in short, gum! So the great and nervous American people presented Marvin with the loan of a perfect boat and went on chewing.

That afternoon he loaded her with provisions and spare gasoline, hired a skiff to tow, and ran down the river to a point midway between the two islands which he had decided to buy. He landed at a pier called Upper Encampment, which extended westward from the shore of a wooded American island. It was a lonely place.

He carried some duffle ashore and pitched his tent. Then he wandered up a wood road till he found a log house. It proved to be the post-office. The postmistress, a sweet-faced woman, lived there with her aged father, who was a gunsmith and a notary. Miss Mabel welcomed the supposed fish-

erman and assured him that he could leave his launch at their pier with perfect safety.

Her father talked freely. Fishing was poor. Bass did not really run until September. The nearest bass ground was below, around the two islands called the Duckling and Old Duck. There was also some fishing above, at Keego, the slender little island so called because it looked like a fish.

Marvin went to his bed of boughs contented, for he had learned the names of the two islands he wanted. They were the Duckling and Keego. Next day he would fish around the Duckling and find out who owned it.

He awoke early, arose and dressed, and went out into the cold dawn. He built a fire and let it burn down while he laboriously captured some crayfish from the edge of the icy river. Then he set his coffee pot on the coals and sat down to wait until it simmered. He was lonelier than ever he was. He thought of the morning when he and Gregg and O. Fisher drank coffee together before starting up the valley of the Surmelin. He wished that O. Fisher were sitting there on the ground, polishing shoes in silence.

The ground was stained with iron. So is all the earth, which would look blanched and ghostly save for iron, but he was on the southern edge of the narrow region from which a billion tons have already been quarried.

Men would go on digging iron till they suddenly discovered that they had no means to smelt it. There it would lie, its atoms arranged in the form of a cube with one atom at the centre, and twenty-

six balanced charges in every atom, as useless as it was a million years ago.

And all because the idiots that called themselves men persisted in killing off their Moseleys. No matter. Of what earthly importance were the regrets of a one-handed chemist sitting on the slag of a solid iron earth?

### Chapter 27. Cobalt

He lifted his eyes and gazed on the Laurentians. Pencils of incandescence swept across them, whitening their tender purple and then fading, a sight to thrill the heart. Sometimes the pulsation would cease and the whole mountain, older than any Alp, would deepen to cobalt blue, reminding him that there might be cobalt within ten miles of him. In fact within a hundred all the noble metals were being mined. Like most men he loved blue, and what he chiefly loved was a soft cobalt blue saturated with white light, as in petals of forget-menot.

But that was mere personal preference. When he thought of color he should not be diverted by living tissue, but ought always to consider electricity. The more charges on the nucleus, the more color there ought to be. Since the first twenty-seven elements are comparatively light and abundant, color in real richness ought to begin at number twenty-eight. He closed his eyes and dreamed of ascending scales—oxides running soberly in red and brown and black, sulphides fitting in with dusky gold, chlorides almost prismatic.

He opened his eyes and perceived a faint mauve, and presently saw that it came from a musk mallow blooming there in the thin soil. It gave him a little shock, for no English or American chemist sees mauve without feeling that English and Amer-

ican must stick together against Germans. It was an Englishman who first discovered how to make mauve, but it was Germans who acted on the hint, ruining the madder fields of France and the indigo fields of Asia. Germans might yet ruin American labor and come to blows with Americans, but Marvin did not seem to care. In the hospital he had hated Germans with a consuming hatred. Now the languor of color seemed to have fallen on him like a dream.

Finally he aroused himself and got down to business. He loaded his skiff, rigged his rod, and brought on board his tomato can with the crayfish. They had no idea of what was going to happen, and neither had he, but he pushed off and rowed south. The water felt good against the blades, always the soft resistance and never too much to overcome with ease.

He passed great steamers that were going up, and thanked God that they were not troop ships. They had saved the day with iron. Doubtless every mile of their course through here had been carefully patrolled. Even now that short black craft slipping past a dull red freighter looked like a patrol.

The river presently turned and revealed a considerable bay, enclosing the island he sought. He swung in westward, and rested on his oars above its mate. This evidently belonged to the Federal Government, for on its eastern shoulder appeared a range light—a tall white pole on which a great lamp is daily run up. Beside the pole was a tiny red roof above a snowy bit of whitewash—the lamp-house where the light-keeper fills his lamps.

He dropped anchor and began to fish. No good. He lifted anchor and tried another spot, but with no better results. Four times he moved, and four times he failed.

He did not care much. There was sweet air in his nostrils, and he did not have to marry Gratia Ferry! Nor did he care when he noticed a bank of smoky pearl coming down the river with some tension in it. He had no fear of lightning and no objection to getting wet. It was purely out of habit that he finally made for Old Duck and sought shelter under the red osiers.

The shower began to patter above him. The electrons crackled across like ripples of white lace fit for white shoulders. Now there stole upon his ears the sound of chimes. A veery was singing in the rain. There was something cathedral in that voice—something high and holy yet human and piercing. Again and again the young seraph rang his spiral of sweetness. Why should atomic rhythms be lost in the crystalline earth, only to emerge as ecstasy?

Then came a whir and a humming. It was another bird. He saw a dim little cross with black edges, the pattern produced by instantaneous wings. Not six feet from him the pretty trifle came to rest, and winked at him. There she sat, a dram of green against the osier. There was no blaze on her throat, but she was even a greater mystery than the singer. How came electricity to shape itself so living yet so jewel-small?

A drop of rain fell on the humming-bird, and she ruffled her feathers. Another drop, and she flew. She went in the direction of the lamp-house,  
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passing through the jungle as easily as thought.

The rain was beginning to soak through the osiers, and again the instinct for shelter awoke within him. He wished to be snugger. How any creature can hope to be snug on the polished surface of an iron ball whirling in open space is not evident, but souls and animals certainly try for snugness. Creatures afraid of lightning creep into feather beds, tramps into haystacks, Eskimos into snowdrifts, rabbits into hollow stumps, saints into the thought of God. In Marvin's case there was a lamp-house near. He arose and followed the humming-bird.

### Chapter 28. Nickel

He emerged in a rushy bay where a dory lay tied to a pier of two planks. Beside it the water rippled with the fins of a string of fish. Doubtless the light-keeper was on the island and would give him shelter.

He entered the bushes again to make his way to where he could see the lamp-house. Presently he perceived the tall white pole carrying the plated lamp, and another step brought him within sight of the house itself.

He paused, standing in a clump of fireweed. He was all bright with the flowers, and straight as if at attention, and unconsciously pressing his cap to his heart. There he stood, his auburn hair getting wet, and noted that the door was open, and thought that nobody was there.

But he was mistaken, for suddenly a girl rose from the doorsill. She stood with parted lips as if gazing at one risen from the dead. Then she suddenly advanced toward him.

"Are you one of Horatio's friends?"

He smiled and shook his head.

"Please forgive me. I thought you had come from across the river. We have never met any of his buddies. He was only a private—"

"But he was your brother."

She burst into tears and hid her face in her hands.

He advanced through the fireweed and put his arm round her shoulders. She quickly got control of herself and looked up at him, smiling through her tears, and for a single second he looked deep into her eyes.

"You must go back to your shelter."

"Then you must, too."

He followed her to the lamp-house.

"I have a key. That is a precaution, in case anything happens to Mr. Gillies. During the war we had to be careful."

"Your brother was with the Canadians?"

"Yes. He was killed in the spring of 1916, and since then I never mention the word explosion where my old father can hear it."

"Is your mother living?"

"No. She died the day after Horatio died."

He asked no more questions, but looked round to see what he could do to make her comfortable. The interior of the sentry-box was painted a pale apple-green, much like the bloom produced by the weathering of niccolite, and that was why he had not noticed her at first, for she wore a soft sweater of the same color. He quickly espied a crate that once had held a lamp, and spread his coat over it and made her sit down.

Then he sat down at her feet, close to the open doorway, and minutes went by with no other sound than the drumming on the roof and the soft muttering in the cloud that surrounded them. At last he heard a dreamy voice.

"Everything looks so different."

"Yes, but we mostly live within a cloud."

"Horatio doesn't."

Marvin was silent.

"I guess you think there isn't any more Horatio."

"I don't know."

The blue of the vapor shut them in, now luminous with reflected charges, now suffused with faint saffron. For the moment they lived in heavenly isolation, a world without passion or poison, where the marriage of true minds is unimpeded.

"Do you think it's impossible for Horatio to think?"

"No, he may think better than we do. Brains are not much good to think with—they're too much like electric burglar alarms."

"Do you think Horatio sees?"

"I don't know, but I suppose that an eye is the least part of sight."

"If he has better eyes than ours, does he see only atoms?"

"More likely colors that we can't imagine."

"Why, you believe it just as much as I do!"

"No, I am just saying perhaps."

"Well, I'm sure about it. I just know he holds the earth off at arm's length, and sees it all showery blue or billowy white. He sees it spin with a sunset edge. Even battle smoke doesn't look ugly then."

"No."

"And sometimes he blows the clouds away and gets the atmosphere. It is full of voices that can't be heard so far—at least I hope he never hears me crying. But I hope he gets my sweet familiar thrushes, my sweet birds antheming the morn. Do you think I'm crazy?"

"Far from it."

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"And you don't mind my using poetry words?"

"I love your poetry words. Please go on."

"Why, there isn't any end to going on. The earth is so beautiful that it makes me cry. When he was on the ocean, I just wouldn't think about the submarines. I thought about the waters at their priestlike task of pure ablution round earth's human shores. If he had to be drowned, he would still be drowned in beauty."

"Yes," said Marvin, his voice barely breathing. He dared not look up, for he knew that the triumphantly modeled lips were quivering, and the forgetmenot eyes were full of tears.

But presently she laughed them away.

"I don't know why I am talking like this to a stranger."

"It's because he's been waiting for you."

"You mustn't say nice things, Mr. Soldier. But there's one question that's harder than any to answer. I never dared ask it of any human being—it sounds so coarse."

"No question of yours," said Marvin steadily. "could be coarse."

"Well, then, do you think that Horatio has the sense of smell?"

"Yes, that is, if he has the other senses. But think how few are the odors that we sense—just the spicy, flowery, fruity, resinous, foul, and scorched."

"It's awfully brave of you to think that, and not make fun of me. If I were an angel I should just love to hold the earth to my nose and smell the sweet-breathing brier. That's eglantine, you know."

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"I know, but the odor is evanescent."

"So are all the woodland odors."

"No. I've found one that will last."

She looked at him thoughtfully.

"Are you a poet?"

"Far from it. I'm a business man. It's a wonder I'm here at all instead of a few miles east, at Sudbury. I might have been sent there to buy nickel."

Chapter 29. Copper

She made no reply. Overhead the turbulent up-drafts fiercely united the drops of rain, disrupted them, reunited them and again disrupted them, and let them fall with heavy positive charges. The little storm was at its height.

Marvin felt dimly that something was wrong. The swift sweet interchange of thought had ceased.

"You don't seem to be interested in nickel."

"No."

"But isn't it rather interesting that eighty per-cent of the world's supply should come from your very door? All the armor plate, the ordnance, the gun barrels, the bullet casings owe a debt to this region, though now of course the demand for nickel has dropped."

"The demand for copper hasn't."

"I'm afraid it has. Most of the mines near you are losing money."

She did not contradict him, and he went on.

"Your cobalt and nickel and copper are so matted together that it's pretty expensive to separate them."

"I guess the expense doesn't prevent."

He turned and looked up at her. There was suspicion in the lids that almost veiled the blue, and disappointment in the curving lips, and pugnacity in the smooth brown jaw.

"What's the matter?"

"You are a business man."

"Do you suspect me of prospecting for copper?"

"Yes, I do."

"But suppose that I am looking for a metal, or possibly a non-metal. Don't you suppose I'd pay what the land was worth?"

"No."

"I'm sorry you should think so badly of me. It looks as we were going to differ."

"I'm afraid we are, and I'm rather glad of it."

The rain began to slacken, many a charge changing to negative, while through the showery strands the island down the river began to show green as malachite.

"Glad?"

"Yes. In a few minutes it will be good-by, and I'd rather quarrel till then."

He rose to his feet and stood looking down at her.

"Why must it be good-by? I never met anybody I liked so much. I don't know what's happening to me—something wonderful and strange. What shall we quarrel about?"

"'Most anything. I don't begrudge the rich anything they have, only I wish they'd let me alone."

"But I'm not rich."

"Of course you are. You look just like a prince."

"Miss Moccasins, all I own is four thousand two hundred and eighty-nine dollars. My father is worth a million, but I won't take a cent from him if you say so."

"You're almost making love to me, aren't you?"

"Why, yes, almost."

"You mustn't. You are as impulsive as a perch. Were you fishing?"

"I was, but I didn't find them very impulsive."

"Didn't you catch a single one?"

"No. Did you?"

"Yes, I have a dozen perch tied to my boat, and one of them is fourteen inches long."

"Fourteen? I'm afraid you haven't much sense of distance."

She picked up a shingle nail and gravely marked off a space on the green wall. He as gravely drew a little centimeter stick from his pocket, measured, and reckoned into inches. She had marked off fourteen less an eighth.

"You leave me no choice. I fear you told me a whopper."

She stamped her foot. "In two minutes I could take that fish off the string and hold him up here against the wall. But I wouldn't. I'd be ashamed to inconvenience him just to please a man who questioned my word."

"I don't really question it, darlin'."

"What was it you called me?"

"I called you darlin'. I used to call them all that, but the war rather knocked it out of me. With your permission I'd like to begin again."

"You'll never get my permission if you live a million years. Good-by!"

"Please wait a minute. I wish to ask you an important question, but I have to lead up to it. I told you how much my father is worth, and now I'd like to know how much yours is worth."

She flushed, but instantly told the truth.

"He isn't worth anything. This year we have about four hundred dollars and a garden."

"Well, I'm hungry, and I have two hundred and eighty-nine dollars in my pocket."

The forgetmenot eyes opened wide with astonishment.

"Very well. I hate business, but I guess I can rob you just as you rob the poor. If you come to my shop, I'll sell you all the perch you want at eighty cents a pound."

"It isn't safe to start a monopoly till you've bought in your competitors."

"Mr. Millionaire, if you think you can find any of my competitors, just go and hunt for them. I buy in the cheapest market and I sell in the dearest. That's business."

"Won't you shade your price?"

"No, sir. I never, never cut prices on perch."

She brushed past him and stepped into her dory. Then she paused and glanced at the spot where he first appeared to her in a vision. She stepped out again, gathered an armful of fireweed, and was back in her boat. She pushed out and began to row.

He watched her, fascinated. She would pull very evenly and strongly, and then pause to look at something, oars in air. All her movements were like that. She would be still for minutes, and then move like a flash.

Presently she reached the southernmost tip of Old Duck. Here she shipped her oars while she did a most surprising thing. She pulled off her green sweater and tossed it overboard, and away it floated down the river. If he needed any proof of

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her scorn for money, he had it now. He watched the thing a while and did not know that he was seeing Gratia off.

### Chapter 30. Zinc

When he looked back to find his new acquaintance, her faithful wilderness had swallowed her up. Only the veery's song, farther away and fainter; only the aeolian tones about him; only the feeling of vanished music and uncaptured song.

Fresh colors after rain now blended where she had been. And still he stood among them, gazing, trying to comprehend the treasure he had found. Thus the miner turns in his eager fingers the crystal that puzzles him, and calls it blende, the thing that deceives.

He had not asked her name. He had made a supreme discovery, and the name was unimportant.

For his predicament there are names enough, ancient and mostly unbelieved. We might say that he had fallen head over heels in love, except that she was not a butt of malmsey or a hollow tree full of honey. We might say that the minute she met him she pursed up his heart, except that she was not in the habit of carrying a purse. At first sight they had changed eyes, but what would that mean in terms of electricity?

To be soberly modern we might say that he had yielded as easily as zinc yields its electrons to copper, plating it round and defending it forever. But the trouble is that Marvin had forgotten all his chemistry.

There he stood, a man of lightning without one word of lightning at his command. There he stood, compounded of hydrogen, carbon, nitrogen, oxygen, fluorine, sodium, magnesium, silicon, phosphorus, sulphur, chlorine, potassium, calcium, iron, and iodine, and not one element had a characteristic thing to say.

But he was swiftly coming to a conclusion just the same. He was reaching the upshot of response. In five minutes he had the resultant in the homely words of old romance. He loved this girl. He would love her and cherish her till death did them part. No lapse of years, no cancer, no disfigurement would make her less dear.

He was in love and no mistake, and the first thing to do was to lock the lamp-house door.

### Chapter 31. Gallium

Next he considered where he should camp. Not on this island, which though dry enough was low and bushy. The Duckling was the proper place. So he plunged into the dripping osiers and made his way to his boat, which he proceeded to overturn and empty of its share in the shower. Then he rowed round to the south and rested on his oars to survey the island that he intended to buy.

But the minute he paused, business gave way to delicious thoughts the like of which he had never known. He had spent a life in training for the sight of her. He must have known all the time that she was there. Just as Mendeleyeff had prophesied an element like boron and an element like aluminum, so he had unconsciously known that there must be a girl as impassioned as Cynthia and as exquisitely self-contained as Gratia. Physically she was like neither, being little and brown and athletic, with eyes that thrilled him, and a short fine nose the pattern of which had never been thought of before. She had beauty and strength and mind and education—though where had she got the education?

Having a tremendous respect for the law of probability, he conceived of her as a farmer's daughter. But what sort of farmer was it who had sent his daughter far enough from home to learn of atoms and to quote poetry with ease?

Cynthia Flory had known atomizers, for Cynthia used to spray her throat with antiseptics and her hair with synthetic jasmine, but of atoms Cynthia was flagrantly ignorant. And so was the sweet cool Gratia. Nor could either of them weave the poets into her common talk as easily as a bird weaves silken threads into its nest, though Cynthia sometimes tried it.

Thank God, the new love was poor and proud. Nobody could accuse him of marrying for money. And now that he thought of it, there was a possibility that the rock he sought might be owned by her father. She must live not far away, or she would not be carrying a key to the lamp-house. The darling—to stand by the United States government in case a light should fail the ships! If the old man did own the Duckling, he should have ten thousand for it.

How long would it take him to win her? She was saucy; she had a prejudice against the rich; she pretended to be willing to charge him eighty cents a pound for perch; and for some strange reason she had thrown away her expensive sweater as if it burned her. All this added piquancy to the situation, but when she knew that he was in earnest, she would melt. She might not exactly melt in his hand, as the metal gallium melts, but she would yield. He could not conceive it otherwise.

So he mused, drifting on the turquoise stream, and finally remembered whither he was bound. He lifted his eyes and looked at the beautiful object that his father would some day sell to be shattered.

There were dark clouds beyond it, but on the new-washed island a sheaf of glory fell, as if on a

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mass of dark green wavellite. The green was pine trees, two acres of them. Even along the northern cliff there were pine boughs, patterned against it with charming interruptions and balance instead of symmetry, or starring it as with wavellite crystals.

To the east it had no harbor, but there in the deep water the largest steamer would be able to lie along its even rim. Westward the shore was deeply indented, like Norway. Here a smooth slope was damascened with lichens. Here a still smoother slope plunged into the water and left the minnows visible above it, hanging like colloidal silver in the sapphire translucency.

Along this Scandinavian coast he moved with gentle oar till he came to a dainty harbor melted out by fire and smoothed down by ice. Within it the water was deep enough to float the Kittiwake safe from storm.

He landed and looked around. He lifted up his eyes and beheld a sign in the heavens. It was set vertically, nailed to a pine, and bore the unwelcome words, NO CAMPING. But as there seemed to be other words, he mounted the cliff and read the whole tale:

NO CAMPING

except on terms.

For terms apply to

JEAN WINIFRED RICH

in

the house with bridal wreath.

P. S.

Have a heart

and do not burn this board

because smooth ones are

HARD TO GET.

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He laughed aloud, for the paint was perfectly fresh. She had flown home and painted this thing since she left him.

But the words were not all. Above them was a sketch of a humming-bird with wings outspread. Yet she could not possibly have seen into the thicket where he and the little jewel had winked at each other. But now he thought of it, he knew what her motions reminded him of. The Indians had named her the humming-bird, and here was a challenge to come and find her in her own nest.

they walked up to the house bent on conquest. He knocked, and she came to the door.

"My name is Mahan, and I am looking for Miss Rich."

"Won't you come in, Mr. Mahan?"

He entered, and stood paralyzed. Instead of a farm-house sitting room with a hanging lamp and a melodeon, this was a noble library. The smooth-hewn walls were lined with books, with one or two bronzes above them. At the north end was a fireplace with crackling birch, and near it stood an upright rosewood piano, very small and old, but so well kept that he could have sworn it was in tune. No signs of poverty here except in that old haircloth couch, which certainly needed new springs.

She motioned him to a seat, and he obeyed as in a dream. He was sitting in the library of some old scholar. He had come about as near to guessing father as Sir William came when he guessed quinine and discovered mauve.

He clung to the collie and for the first time understood what bashfulness is like.

"Wonderful dog," he said at last.

"Yes, Agricola has his points."

The young man searched his memory in vain, like one who has laboriously primed himself to listen to the converse of specialists, only to be left behind at the first sentence. Yet "Agricola" sounded strangely familiar. He reckoned it was one of Julius Caesar's men, the one perhaps that built a bridge across a French river.

"Did you call on business?"

"Why, yes, Miss Rich. I'm on my way to the fish market. I understand that perch are selling

very reasonably this morning—eighty cents a pound, if the market report is correct—and I wished to order, say, ten pounds.”

She looked at him demurely.

“I keep the market myself, but I’m out of perch. The hotel took them all.”

“Could I—could you direct me to the hotel?”

“You are in the lobby now.”

“You mean I can actually stay to dinner if I have the price?”

“Of course. Dinner will be ready in half an hour. But our rates—well, you see, there is no other hotel in these parts, and the rates might seem unreasonable. Shall I mention them?”

“Not till after dinner, please.”

Off she went without another word, and Marvin drew a long breath. He rose and moved round the room. He picked up a daily paper, laid it down, and picked up the only other journal in sight, the current number of a philological review. The cover bore the table of contents, and the second article was entitled “The Algonquin Pronominal System,” by Ambrose Rich. He turned to the end of the article and found it communicated from Upper Encampment, Michigan!

He reverently laid the Algonquin pronominal system back on the table and turned to the shelves. Books in every language he had ever heard of, grammars by the yard, tomes that keep the buyer poor, and not a single recent volume except the last edition of the Britannica! Finally in an obscure corner the gleam of gold revealed the name “Rich” some six or eight times repeated. He drew forth the three largest volumes, opened one, and read:

"The Complete Works of Cornelius Tacitus, edited with English notes, critical and explanatory, by Ambrose Rich."

He carried those three volumes out to the porch and solemnly sat down to educate himself. Half an hour was not much, but he must do what he could. His Latin was mostly oxides long ago, but he could read English if not too hard, and he read a crisp summary of the Germania. He read of Angles and Saxons and stern family purity. He read of amber, the first substance to give away the electric constitution of things, though the editor was evidently innocent of any physics since Lucretius. Amber was own cousin to the pepper on the editor's table, but doubtless the old man cared nothing for such relationships.

And then, glory be, he discovered who Agricola was. Once upon a time, when St. Paul was yet alive and rather disapproving matrimony, the young and nervy Tacitus presented himself before General Agricola with a request for the hand of his daughter. Agricola consented like a man, and went off to govern Britain, where he doubtless set the Mahans to draining marshes.

Enough. He would imitate this Tacitus. He would find and face the caustic old scholar, and be scowled at by fierce blue eyes from under beetling brows, and register as a candidate. There must be others, but they couldn't be worse than the Germans at Mezy.

The dog seemed to understand perfectly, and so they set off up the path.

### Chapter 33. Arsenic

They had not gone a hundred feet when Marvin thought he heard a bar of sacred music floating out of space. It was a man's voice, and the words were faint, but they sounded like "joy of heaven to earth come down." And they seemed to lead his eye up the hill to a point where the path entered a glade in the cedars. He could see a spot of yellow there, as if buttercups made a patch of orpiment.

Fixing his eyes on the gold he presently saw a slender form emerge from the cedars. He did not need to be told who it was—that slow step, that silvery halo beneath the old straw hat.

The dog silently sprang forward, and Marvin gave chase. The hill was steep, and the chemist arrived with just enough breath for four words:

"Good morning, Dr. Rich."

"Good morning, sir. Sit down and rest. Your heart is not so strong as it ought to be at your age."

Marvin threw himself down, and the old man set down his basket of vegetables, beside which *Agri-cola* at once went on guard.

"You look as if the enemy had made you a gift."

"Only this," panted Marvin, showing his gloved hand.

"But gift," smiled Dr. Rich, "has a special sense in German. It means love-gift, hence love-potion, hence poison. Were you not gassed?"

"No, this is only the poison of influenza, and I'm grateful for it. It brings me here."

The doctor sat down and plucked a buttercup.

"I think I can understand your feeling. You have escaped from the poisoned air of cities into purer air. There is not a poisonous miasma in all this region, and there are few poisonous flowers. These stamens are male, but they suggest only the beauty of Persian gold, not the blunder\* by which the Greeks called a certain substance arsenic, the male element. From this hillside you may have the illusion of elysium, where the mind moves freely and finds all things harmless. When you get your breath, I should be glad to hear if you have hopes of elysium issuing from war."

"I have hopes of chemistry, sir."

"You are a chemist, captain?"

"Yes, but please drop the title. Please call me Marvin."

"Well, Marvin, you shall dream of a chemical heaven as much as you please while you sojourn here. And you shall rob my garden without asking permission. Agricola, give your new friend some strawberries."

Agricola moved the basket over and politely wheedled.

"Not for me, governor. Strawberries picked by the editor of Tacitus are too expensive for a Mahan."

The old New Englander looked pleased, but he was dry about it.

"The name Mahan is Irish. I've no doubt your forefathers blarneyed Agricola in the same fashion. But at least take some lettuce. You shall not be like the poor fellow in Aristophanes, and take your sorrowful leave without a lettuce."

"But I've been invited to dinner."

"Good enough! Is the heart all right now?"

Marvin arose, and the two men proceeded down the path.

"Where are you camping?"

"I'd like to camp on the Duckling."

"So do. You are as welcome as sunlight."

"Dr. Rich, the sign is not quite so hospitable as you are."

"A sign? Has my daughter actually forbidden trespass?"

"Oh, not so bad as that, but it's nailed to a pine. Dr. Rich, pines are salable."

"To you?"

"Yes, sir, and so is the island. And were these the days of marriage by barter, I'd offer you all my worldly goods for your daughter."

"Go slow, young man. In the first place, it's her island, not mine."

"Hers?"

"It is. She has owned it since she was a baby."

"Then I wish to make love to the owner."

The old man stopped short in his tracks. He reached out and plucked a spray of cedar—flat, evergreen, like a flower so loved and pressed that it could never lose its fragrance. The spray trembled a little as he held it.

"Are you serious?"

"I was never more serious."

There was a long silence, during which the old man gazed at the Laurentians and turned the spray of cedar in his fingers.

"Dr. Rich, when I say make love, I mean for the

next fifty years, but so help me God, it shall never be unwelcome love."

The old scholar laid a hand on his shoulder.

"In such matters, my boy, you are an open book that any man may read. But it can't be three hours since you met her."

"Yes, it sounds like a freshman."

"Not necessarily. Landor was thirty-six when he first met his wife. He vowed that she was the nicest girl in the room and that he'd marry her. He did so within six weeks, and lived to repent. But Jean's father first met his wife when he was forty-six, and married her within a week, and has warmed his hands by that immortal fire till this very hour. How old are you?"

"Twenty-six, sir."

"Just the age of the son I lost."

"Dr. Rich, she told me. If you could find it in your heart to let me try to take his place so long as we both shall live, you'd make up to me for all my disappointments."

"In what have you been disappointed?"

"I have wished to study the innermost nature of matter. Instead I must earn my living as a chemical engineer."

"You have no desire for commercial success?"

"Not the slightest."

The old man caught at the cedar tree as if to steady himself before a firing squad.

"My son, I will not stand in your way."

Then he slowly proceeded down the path, glancing neither to left nor to right.

"Marvin, I assume that you will not be preci-

pitate. Give her time. I wish I were Laban, and could make you serve seven years."

"I'm game, sir."

"Better keep off business topics. She's patriotic, but she's like the girls who mobbed Cato. She can't be driven."

"What had Cato done?"

"He wanted their earrings to convert into war galleys. He was determined to crush Carthaginian competition in business. They declined, not that they loved Rome less but that they loved earrings more. And my daughter loves her island."

Marvin sighed deeply as he began to see the complications ahead of him, but was recalled to the present by his companion.

"How long is yonder grain boat?"

"About four hundred and twenty feet."

"Correct to the foot. And it's about the length of the Egyptian transport used by Augustus to ruin Rome. He had lectured his nobles for not marrying, but he brought their farmers into competition with Egyptian slaves. By the same token, though our friends across the river are not Egyptian slaves, the entire Canadian crop will go into storage this year, and in 1920 American wheat will not bring what it cost to raise it."

### Chapter 34. Selenium

They walked on down, and Marvin drew deep breaths of relief and satisfaction. No matter how difficult the future, he had thus far met only sweet reasonableness. The nature of this old man was noble and ample. The air he breathed was one-fifth oxygen, the mountains about him were half oxygen, the river he loved was eight-ninths oxygen, and his soul was like them all.

Here were no volcanic passions depositing sulphur on the earth. If there had been such in his youth, they were all transformed to gentleness, just as sulphur has proved the most valuable of all chemicals to shape the objects used in civilized life.

So reflecting, the young man found himself once more in the library and presently called to dinner. The white sun slanted through the window and fell upon her long-sleeved tire as she stood there smiling. Her table was pretty with crimson radishes and with pale heads of lettuce cut down in the middle, revealing exquisite convolutions. And in the midst she had placed her armful of fireweed, which glowed almost as red as the radishes.

He seated her. Then father and daughter bowed their heads in gratitude to a silent God, and he followed their example.

Presently she was serving him soup made of hulled corn and full of minute golden nuclei. Next the perch came on, all decapitated except the

big one, and all encrusted with delicious starches blended and browned. Marvin received the biggest, and before beginning on it drew out his centimeter stick and measured it.

"Dr. Rich, you have a remarkably truthful daughter. This fish is even larger than she said it was."

"I trust," smiled the doctor, "that she is just as truthful about everything. She has never told me anything but the truth, and not much of that."

The sunlight that slanted across the long-sleeved tire seemed to lessen a little as Jean looked up. There was no reproach in the forgetmenot eyes, but the old man's gentle shot had told. This girl did keep things back from her father. Perhaps she did not let him know when the larder needed replenishing.

Once and again, as the happy meal proceeded, the guest had the same sensation. Now she would flash into merry words, now sink into shadowy reticence. Now she was electrosensitive, now perfectly neutral.

They came to salad, and he lifted the bowl of mayonnaise.

"You ought to have let me make this."

"No, indeed. That would have cut down my profits."

Marvin stirred the contents of the bowl and reflected that if he could explain the surface tension in mayonnaise he could explain a great many other things.

She broke in upon his reverie with a little laugh.

"Once upon a time I asked an Indian boy to get me some olive oil. I called it wood oil, because of

course he wouldn't know what olives are. What do you suppose the result was?"

"He brought you wood alcohol?"

"No, he asked for lard stick and brought me a strip of bacon."

"And after that," smiled her father, "she took him as a pupil and taught him English."

"Did he pay her?"

"I'm afraid not. She loves him too much."

Jean tossed her head.

"I'll say the Little Pine owes me thirty dollars."

"How old is he?"

"Almost fifteen. Some day or other he is going to be a doctor, and when he has grown very rich, I shall send him a bill for those lessons."

With that remark, of which she did not mean one single word, she whisked away the dishes and presently returned with a shortcake.

Marvin watched her cut it. Very slowly her sharp knife descended through the fruit and crust, and each wedge came away without spilling one drop of its pure red.

"You are very deft."

"So are you. I was going to cut up your perch for you, but I saw that you didn't need me."

Marvin soberly began to eat his shortcake.

"Miss Jean, your hands do so many beautiful things that they ought to be worth a great deal of money. But I have only one hand, whether to do things with or to offer in marriage. I have a proposal to make to you."

Dr. Rich glanced up in alarm, but Marvin went on calmly.

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"I can't wash my own hand. Please consider a proposition to wash it for me every day. I am willing to pay a dollar a wash. Don't you think I ought, doctor?"

"Marvin, I do not. I enjoy your fun, but pray don't carry it too far."

"But haven't you noticed how enterprising your daughter is getting to be? She is going to collect bills of Indians, and after dinner she is going to take my last cent. I don't even dare to ask her the time of the day without adding, 'How much?' "

The doctor smiled. "When you find the answer to that question, I wish you'd let me know. The value of the time of day is often infinite. So is that of commercial rectitude. How honest ought a man to be? He ought to be infinitely honest. Of course he can't be, but he ought to be. So if you young folks are about to consider your infinite obligations to each other, I think I'll go and take a nap."

They rose while he left the room, and then sat down again.

"He gets so tired. He is nearly seventy-four, you know."

"Is it possible?"

"Yes, he was born in '46. He still has keen vision and hearing, but it breaks my heart to see him losing his resistance."

"Losing resistance? Please don't vex your soul with any such notion. All he needs is an audience to talk to. Coming down the path he got started about grain, and if there is a live subject in the year 1919, it's grain. I think we ought to draw him out on that subject. In fact I'd like to see him

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invited down to my old college to talk about it. What your father needs is a little light of publicity once more."

### Chapter 35. Bromine

She rose and brought him some coffee, and as he sipped it he proceeded to business.

"If I am to be infinitely honest, I must begin by inquiring whether I have enough money to settle my dinner check. Were those the berries he picked this morning?"

"Yes."

"A scholar seventy-three years old gets down on his knees and picks berries for a man one-third his age. I can't expect such a man to sell to me at market rates. Did you make the bread and butter?"

"I did."

"And you cleaned the perch, and fried them, and beat up the mayonnaise, and mashed the potatoes and browned them in the oven, and baked the shortcake, and spread the table, and decorated it, and waited on me. God help us, what things a girl can do if she tries!"

To this eulogy Jean made no reply, but she certainly liked it, and it made her eyes shine.

"Then there's your damask. Who could expect to find a cloth like that up here in the wilderness? It's darned, but it's embroidered with the initials of a gentlewoman."

"She was," said the girl, and the shining eyes were suddenly dim with tears.

"Well, now, considering all this luxury, how much is the check?"

"I don't like to tell you. When I came in I had made up my mind to squeeze seventy-five cents out of you."

"That's a pretty large tip."

"You know I didn't mean a tip. You just sit there and make fun of me."

"Well, you just sit there and pity me. I don't suppose I can pay what your father's remarks on infinity are worth, but I can pay ordinary hotel rates. I arrive here expecting dirt and ignorance, and I find dainty cooking, damask, flowers, and infinity. Here is five dollars."

"Mr. Mahan, you are perfectly horrid!"

At this point the collie came in from the kitchen, and put his chin on Marvin's knee.

"Governor, do you insist that five dollars is the minimum?"

Agricola barked assent, but was instantly sorry for it. He had not expected that the divinity to whom he belonged would say, "Ahnemo-sheesh!"

The dog cringed and made for the door.

"What did you say to him?"

"I told him he was a bad dog."

"I hope he swims over to my island and stays there."

"*Your* island?"

"Well, the one I expect to rent. How much will it cost me?"

"Fifty cents a day."

"But that doesn't assure me sole possession. I want those ten acres for myself and my friend the governor. I'm willing to pay nine dollars a day,

and if you will come over and call on us each day, I'll make it ten."

"Mr. Mahan, I have let those pines stand so that everybody on the steamers could enjoy them. Do you suppose that after doing that I am going to steal?"

"Very well, I'll take it for half a dollar. Now about my hand."

"I'll wash it with pleasure. If you insist on paying, it will have to go dirty."

"But you won't be able to endure the sight of it when I come to meals."

"Are you coming to meals?"

"What else can I do, since no fish will bite me?"

She burst into laughter at last, while he counted out twenty dollars.

"That's a week in advance. Your rates come to nineteen and a quarter, but twenty is easier to reckon."

He took her hand, laid the bills within it, and closed the fingers over it. She opened her fist and took out two of the crumpled fives. She lifted poor Pat and tucked them under his helpless thumb.

"Now just go over to your own island, pick out the softest moss you can find, and take a long, long nap."

"But I can't, unless indeed you give me a bromide."

"But you must, until that tired look in your face is all gone."

"Look here, am I running up a bill for medical advice?"

"Mr. Mahan, I don't want to see any more of you till I ring the bell for supper."

### Chapter 36. Krypton

He found his cap and went out on the porch, taking care that the screen door should not slam. But instead of obeying orders, he sat down and enjoyed the landscape.

Beyond the Duckling appeared the Canadian shore, a forest retreating slowly to a mountain. He knew from his map that he was looking at a Canadian island thirty miles long. The name on the map was St. Joseph, but according to the old gunsmith the real name was Bay-quah-de-nah-shing, the island with a mountain.

From his own explorations he knew that the mountain must command a wonderful view. But it was ten miles away, and it stood to reason that the Riches could not afford to visit such heights. Therefore it would be decent in him to send them up there. While they were gone he could take a good look at their larder and see if it needed replenishing.

He stole around to the back door and entered. She paid no attention to him, because he was violating orders.

He seated himself on the woodbox, which was full of newspapers and silvery birch, and offered a few well chosen words about the neatness of the kitchen. No response.

He watched her wield the dishmop with bewildering rapidity, and scald the china with floods.

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He watched her wipe it, seizing each piece with a quick firmness that seemed likely to break it, but never did. He kept still, but since he was very close to her he at last made her nervous, and she dropped a bit of Worcester Royal. He caught it, and remarked that the robin's egg rim was exquisite.

She received the treasure back with a smile of gratitude, but did not deign to tell him the origin of the plate. She knew that it had been ordered from the pottery for her mother as a wedding gift and that it did not arrive till months after her mother was married. It was from a friend down east to whom her mother used to refer as Susan Endicott.

By and by Jean filled a fry pan with odds and ends for her dog, and stepped outside to find him. The minute she was gone, Marvin slipped into the storeroom and lifted cover after cover. Almost every container was empty.

When she returned, he was sitting as before on the woodbox, pinching Pat's fingers as if to restore circulation.

"Now that you are so rich with your ten dollars, don't you want to go shopping? I have a borrowed launch up at the post-office pier."

She shook her head.

He reached down into the woodbox, extracted a newspaper, and proceeded to return scorn for scorn by reading to himself. But suddenly he made an exclamation.

"Why, it says here that Dr. Ambrose Rich and his charming daughter are going to take a drive tomorrow afternoon, leaving the Rich pier at two

o'clock fast time, in order to view the landscape from the top of the mountain!"

She dropped her dry towel and exclaimed,  
"Oh, how wonderful!"

It was enough. He was off before she could take it back. The dog followed him and crossed with him to Canada. He made his way through the woods to the first clearing, and was allowed to telephone for a car, and to leave the payment.

Then he returned to the shore and viewed the Duckling as it lay against the western sky. From this side it was a smooth lump of silver rising into malachite pinnacles. He could imagine it in sunset as a cathedral with windows of glory, and after sunset as a smoky crystal lying under the crystalline heavens. It troubled him to think of shattering such beauty, but it could not be helped.

All winds were hushed as he made his way back. The surface was smooth as a lover's dream, and every touch made a whirling flower, and the blade dropped a long line of interwoven circles.

Softly he glided into port. Softly he ascended to the smooth board that was so hard to get. He removed it from the pine, made his way over the rock, and lay down where gray moss had gathered deep. A little breeze sprang up and brought him the perfume of the grass which Indians weave into their baskets. The dog lay at his feet, with one soft paw on the totem board. But the man could not sleep. All he could think of was the utter emptiness of her larder.

He arose, penetrated the grove, and stood looking about him in the shadows. The wind whispered like distant surf. From the warm pine needles

arose a sleepy odor and also a delicate sweetness. Looking down, he saw the living mist of the twin-flower. To catch the elusive fragrance he reclined and inspected the source. He rested his head on the ground, and let his eye travel up each stem to where it branched in a sharp angle, suspending its roseate and balanced bells.

And so he lay, still thinking of that tragic store-room. Presently the dog pricked up his ears, but it was only at the sound of a partridge talking to her young in a voice like the rippling of water in a trout brook.

Overhead a white-throated sparrow was saying something. New Englanders hear it say, "Peabody, Peabody." Canadians incline to think it laments, "Poor Canada, Canada." Ojibways hear a warning: "Jeegabeeg, jeegabeeg, jemaunense," that is to say, "Keep in shore, keep in shore, little boat." But these interpretations must be inaccurate, for Marvin, listening with all his knowledge of vibration rates, distinctly heard it call, "Jee-an Winifred, Winifred."

Under the circumstances he had to hop up and see if she was coming. Nor was his anxiety unrewarded. He discovered that she was rowing out toward the range-light, while the light-keeper was approaching in his motor-boat. Soon he saw her standing in the little bay, waiting for the launch to drift in. He saw the light-keeper touch his cap and stand up to listen. She talked to him and handed him something.

Marvin sat down, patted the dog, and reflected.

When she had returned home and disappeared

within the house, he rose up and rowed over to Old Duck.

"Good afternoon, sir."

"Guid afternoon."

The light-keeper began to haul up his lamp, with an unlubricated sound that did not encourage conversation, but turned his head long enough to reveal a small blue eye and a yellow spray of beard. Then he looked back and aloft.

"I am camping down below, and my name is Mahan."

"Glad to meet ye, Mr. Mahan."

"Mr. Keeper, you have just received ten dollars, haven't you?"

The official fastened his halyards and turned round.

"'Tis a fine afternoon, and my name is Gillies."

"Mr. Gillies, I want you to find some way of putting that money back in her kitchen."

The Scotchman chuckled softly. "Are ye a scollard of the auld man?"

"Mr. Gillies, are you aware that the grain boats of Augustus Caesar were four hundred and twenty feet long?"

The Scotchman chuckled again. "It doesna require a boat so long to go to the Soo. Would ye be going?"

"Not till tomorrow morning, but then I shall bring them some provisions. They'll be taking a ride in Canada, if it doesn't rain. What's the prospect for fair weather?"

"Good. But it might blow up hard if she comes home and sees an Irishman with a bag o' flour on his back. An Injun would be more to the purpose."

"That's a good idea. Any Indian in particular?"

"Na."

"I will try to find one. How can we get the money back?"

The Scotchman advanced to his launch and stepped in.

"Were ye in France?"

"I was."

He drew from underneath the bow a small bag. "A Frenchman gied me this. He called it sarrasin, but it's plain buckwheat."

The canny Scot loosened the string, took from his pocket two five-dollar bills, laid them within, tied the bag up, and placed it in Marvin's skiff.

"Augustus Caesar, ye say, was engaged in the grain business. So was Joseph before him. But I hae me doots if Caesar's dog or Joseph's dog wad fetch and carry like Jeanie's dog."

### Chapter 37. Rubidium

The tent was pitched, and dusk began to settle. The thrushes were filling the cathedral with chimes, and the windows began to glow. He felt like a vandal. The owner of this sacred place would never willingly destroy her church of Rheims, with its vesper windows and vesper bells, and the winds of eternity lingering among its columns.

At last came the tinkling summons, very faint and far. He arose and emerged upon the rocks. He would never have guessed that there had been a shower that day. Save for one low panel of cloud, all heaven was luminous above his young love there in the west. In that line of ultramarine a single light burned for him. Above it the tender reds of the open sky, and below it the tender reds of water, all tenderly bright from shore to shore.

Presently into that pure beauty someone had the courage to paddle a canoe. He looked, and saw that it was the doctor himself, facing forward to see the sunset, and followed by a silvery wedge. Marvin clambered down the rocks and followed the silver.

The point of light slowly became a window. By day a house is mostly a house, but when its evening lights shine out, it becomes a home. He was rowing home. And as he landed and walked up the path, he wished that he might never leave this place or her.

He strolled in and presented himself in the kitchen, holding out his hand. She had not forgotten. A new cake of soap was visible, with towels bleached in the sun. She proceeded to fill a basin with hot water, testing it on the hypothesis that what suited her would suit him. Then she dried her hands, unbuttoned the sleeve of his blouse; and rolled it back.

Shades of old chemists gathered in the kitchen to watch the experiment. They never come when hands are ungratefully washed, but here were Geofroy and Scheele, Chevreul and Leblanc, to watch their discoveries comfort a hand in which they were interested. They were for him. But the soft electricity of the emulsification was less comforting to Marvin than the soft electricity of her touch.

At last he was triumphantly dried and ready for supper, and curious to know what she had managed to assemble out of her empty storeroom.

He soon found out. There were fresh eggs, each a marvel of organization. There was baked macaroni with a crust of cheese. There were beautiful biscuits with never an atom of sodium left in them. There was strawberry jam transformed by its Indian name of bashkeeminsigun, which sounds more delicious. And there was fragrant oolong, concealing rubidium in its leaves. She had made a feast out of nothing, but he knew she could hardly do it again.

"Do you mind telling me what we shall have for breakfast?"

"Buckwheat cakes."

"With maple syrup?"

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"Why, I guess so. And for dinner tomorrow we'll have bass chowder."

"I beg leave to doubt that. Bass don't run till September."

"Mr. Mahan, there are bass within a foot of your island. Tomorrow I shall come and catch one under your very nose."

"I'll bet you don't. I'll have him all caught before you get there, and make you pay me eighty cents a pound for him."

They exchanged mischievous glances and both looked down. Minute by minute they were approaching the point where nothing short of violence would separate them. Had he been sodium and she chlorine, they would have turned into table salt before the astonished father's eyes. And indeed Ambrose Rich was not blind. He saw his disaster steadily approaching, and resigned himself with the courage of a historian.

After supper Marvin sat down in the library and lighted the pipe that of late he had rarely touched. He wished to hear Dr. Rich talk, and he wished to see if Jean would slip out of the house to borrow maple syrup. When the soft rattle of dishes ceased in the kitchen, there was silence. She had departed, and he imagined her paddling up the river to Miss Mabel's.

So he opened up the subject of grain, and soon had the scholar tracing it from the earliest days. He learned that long before Christ the farms of Italy had passed from the small holders and that these were herded in barracks. He learned of the effort of Gracchus to limit farms to two hundred and fifty acres, an effort that cost him his life. He

heard how the younger brother tried to liberate the farmers by curbing the power of the senate, and how Caius had to kill himself to escape the senatorial mob. •

He was astonished to be told that the revolt of his own British ancestors under Queen Boadicea was probably caused by the sudden withdrawal of a gigantic mortgage held by the moralist Seneca. Such were the things that ruined Rome. The picture grew blacker and blacker till it reached the reign of Domitian, when half of Italy lay uncultivated, and the farms of plundered Greece refused to yield another crop. The earth seemed about to be inherited by two surviving classes—the money lenders who devoured everything, and their slaves who could live on nothing. The thrilling recital took up an hour, and was full of wholesome warning for America.

. But there was still no sound in the kitchen.

A question or two started the terse eloquence again. New emperors discussed the situation. Nothing could eventually save Rome from exhaustion, but something might be done to defer the collapse. He saw a system of state loans developed and the agriculture of northern Italy restored. He saw farm colonies established for time-expired soldiers. He saw the profits of state banks devoted to education. He beheld the franchise granted to women, and two Julias sitting in the senate. He saw every effort made to restore the sacredness of marriage, though that was the most hopeless enterprise of all, since it had become a matter of commercial contract. As Tacitus put it, the advantages of childlessness prevailed.

He listened to a keen analysis of the money system, with its progressive contraction. And when finally the doctor unexpectedly revealed an intimate knowledge of American farm loans and farm colonies, Marvin vowed to himself that this man should lecture at Yale.

The second lecture was hardly over when he heard the screen door of the kitchen lightly open and shut. He rose and expressed his gratitude for what he had learned, and when Jean appeared in the door of the library, all glowing with exercise, he went forward and took her by the hand.

"Do I need to tell you that this has been the happiest day of my life?"

She glanced down shyly. "I'm glad you liked it."

### Chapter 38. Strontium

The happy youth rowed off to his own hired island and for a time sat watching the port lights coming up the river, red as a nitrate of the thirty-eighth element. Then he went to his tent and wrote a letter to his father. In case any lectures were to be offered in the Yale summer school he would like to suggest that two by Dr. Ambrose Rich on "State Help to Farmers" would prove acceptable. He wrote also to Kate Coggeshall, expressing the hope that if Dr. Rich came to New Haven, she would see her way clear to invite him to Wickford, to talk about Roman ladies. He begged her to use the enclosed hundred as a lecture fee.

These letters written, he took his fill of deep and liquid sleep.

He awoke with the thrushy dawn and lay listening. He summed up yesterday in a flash, and was sure he had made no mistake. It was a century of new life, and there was more to come. He should feel very sorry to miss any of it, and he'd better be up.

He rubbed the delicious sleep out of his eyes. He arose in pyjamas and made his way toward the east. When he emerged on the long even rim next to the channel, what he saw was beryl beneath and magnesium garnet above, with the sun still hidden. A year ago that unrevealing glory hid some thirty million men busy at the day's killing. Now it was

full of new starts, like the tuning up of these birds.

As he stood there he began at last to see why electricity shaped itself into hydrogen and so on up, till it attained to dawns, and thrushes, and Jean. It was art. It was the divine art of making vibrations audible or visible. Just now he was supremely content with his own level of perception, for any other would have meant different sights and sounds. Much as he loved her cheeks, he had no desire to hear the ruddy waves within them boom like surf on a limestone shore. Much as he loved a short ray, he would rather not be tuned up to three quintillion vibrations a second, at which rate he would see only her bones.

Thus content with every common sight, he perceived one coming up the river. It was the patrol boat going to town. He ran down the rocks with his letters, seated himself on a thwart all covered with dew, rowed out, and was relieved of his burden.

The row warmed him a little, and he determined to have a swim. He presently emerged from his tent as God made him, with soap and towel next to his godliness. He walked through the tickling woods and searched out a southern rock below which the beryl looked bluer, and plunged.

His first impression was that he was done for. It seemed impossible to get his breath as he came up. He managed a stroke or two, and hung to the rock like a dead man. But his heart presently picked up its beat, he dragged his numb limbs out, and after a good rub-down he felt better than ever.

So he rowed across and hunted up Dr. Rich. He walked half way up the hill to a little meadow

hidden in the cedars, which were wonderful to look at in the dawn. The sun was turning them into luminous aquamarine, as if in a vain effort to reveal the atoms of that living wall.

Music was gently issuing from a barn made of logs. He stole near, and beheld the good white head like a drift of snow against the deer-like flank of a Jersey. The doctor was milking a cow and singing a hymn, while Agricola stood guard.

Marvin stopped and listened. The old sweet baritone continued to arise, there where the clover was lofted like immortelles: "Love divine, all love excelling, joy of heaven to earth come down."

"Good morning, my son. Don't ask whether is such a thing as love divine, all love excelling. Just enjoy it."

"Shouldn't I look facts in the face, sir?"

"By all means, but the more you look them in the face, the more likely you are to see the face of God. You should not believe in God if you can help it, but you can't very well help it. Note how you fall into theology at every word. You speak of looking facts in the face, forgetting that facts have no faces. You chemists simply give them a face, thus acting the part of God. It's all right. If there is no Good Lord in heaven, be a good lord yourself."

Marvin laughed, and promised to remember the advice.

The milker rose with the pail, on which the foam was deep and white. The observer stood and admired the cow.

"Doctor, note the way that front haunch comes down."

"Why, man, I've noted it every morning since she was a fawn. She comes home every night like a tame doe."

They strained the milk and took it to the ice-house. From within the kitchen came the sound of a sweet voice humming a tune about the twelve days of Christmas and the gifts her true love sent to her, which included four Cornish birds, three French hens, two turtle doves, and a partridge upon a pear tree.

The two men stood smiling and listening.

"Doctor, maybe I'd better get her some little gift before breakfast. What do you advise?"

"My son, that partridge is a corruption of 'part of a mistletoe bough', alias golden bough. So you'd better bring her some sort of golden bough. Agricola, flowers!"

The dog started up the hill, and Marvin followed. Resting on the ridge for a few minutes, he discovered a grave beneath the pines, nameless, but covered with little white blooms of mitchella, fragrant as any flower that blows.

He went on down to the doctor's small paradise enclosed by woven wire to keep the deer out, and easily discovered the right flower, a kind of golden iris. Its petals had a thin luxuriance that suggested wither, as if gold had indeed been persuaded to grow like organic stuff.

He brought it home to her, and she called him Midas, and let him place his tribute on the breakfast table.

A little later she let him share the fun of baking buckwheat cakes.

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"But," said the doctor, "I didn't know we had any buckwheat."

"Oh, it's a present from Mr. Gillies. He sent it up by the dog, and he sent back ten dollars that he owes you for potatoes."

And Marvin grinned in the kitchen while he baked griddle cakes as big as a stove cover. Her own versions of beechnut wheat were about as large as the first ring that breaks from a beechnut falling into a pool, but she did not refuse to eat his.

### Chapter 39. Yttrium

After breakfast he made no delay, for he wished to catch that bass. First he took a good look at his island to see where she kept her private ice-box. On the west it was full of fiords, but it struck him that on the east it resembled Resaron, the little Swedish island that has revealed four elements to the world. His tent stood on the Duckling about where the hamlet of Ytterby stands on Resaron, except that no brook led down to the water.

Instead of a brook the Duckling supported a line of bushes—blueberries and sweet gale—leading out to the edge of the cliff. A blueberry can extract delicious acid out of silica, and sweet gale can take up the odor of pine needles and change it into that of bay leaves. He remembered how the bushes mantled the rock clean down to the water, and determined to try for bass at that point.

He descended to the boat-house and stole a dozen minnows, leaving about twenty-seven grams of silver in the minnow pail. Then he rowed over to Ytterby, selected a great triton of the minnows, and experimented. The cliff was no place to land anything, but as he really expected nothing—

He got a bite! Say rather a submarine starting for Finland! His line whizzed away, swung through a quadrant, and started back. He reeled as fast as he could, and with one strong effort

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swung a five-pound bass clean up over his head. It landed in the bushes, and he had to go in head first after it.

Then something happened. The man disappeared, pole and all. He felt the darkness of a cave, the ledge of rock that struck him across the heart, the ice water closing over him. Then he was rising and feeling for the ledge. He found it, crawled up, and fell forward. He bit the air, but his breath refused to come. . . .

Meantime Jean had finished her dishes and assembled the materials for her chowder. She had everything now but the fish, and all she had to do was to go to Pukwudgee and get him. Pukwudgees are Indian fairies, and she had always called her cave by that name, for once it was haunted by the little wild men.

She ran down to the boat-house, found the silvery sunken treasure among her minnows, and laughed. She rowed to Pukwudgee and tied up the branches. She trolled deep, got a strike, and felt her fish make for the cave. She played him gently out again, but suddenly he put on weight and rose in spite of her.

Instantly his weight disappeared, and she thought he had torn the hook out. But no, as she reeled in she saw a second line, one that had crossed hers. It came up tautly from within the cave!

There could be but one explanation—there must be an opening above, and a terrible thing had happened!

She slipped off most of her clothes, stood for one instant unseen and beautiful on the stern of the

dory, and dived. She came up within, and was instantly on the ledge. There was light enough from above to see him clearly. She put her ear close to his heart and heard it beat, and then burst out crying.

He gave a sigh.

"Is that you, nurse? What are you crying about?"

"I always cry when I'm happy."

He reached out his hand and touched her bare arm. The hand drew back, but she closed her own about it. He lay still, clasping it closely.

"Jean, what do you want me to do?"

"Keep your eyes closed."

"I will. Is it any use to call for help?"

"No. We're going back into the water. Just float, and let me do the rest."

She slipped off the ledge and eased him down on his back, and swam with him upstream.

The cave was narrow, but the entrance was a foot under water. Having reached it, she moved to the right, feeling with her toes for a jut of rock. She found one, and now had something to push against. Marvin's left armpit was locked with her own. She reached over and grasped his nose with her thumb and finger, and down they went like two seals diving. Then, gathering all her forces, she sprang forward. The effort sent her far from all support, but carried her under the barrier. Now they were rising, and now she felt the rock against the nape of her neck. She had made it, if she could only hold it. She set her jaw and stiffened her neck and drew his head up into the air.

Now her right hand was free, and she caught the sweet gale. Inch by inch she drew her burden along till she reached her dory. She lifted herself in, still holding his collar by one hand. She braced herself, exerted every gram of her strength, and slid him into the long-suffering boat.

"Please pull my fish in. The line is caught around my leg, and I can feel him whenever he moves."

She obeyed, and dropped the five-pounder beside him, where it flopped with unwonted intoxication of oxygen. Then she hauled in the other end of his line and finally his dripping pole.

"Tell me when to open my eyes."

She stood up and put on her blouse and skirt and moccasins.

"Ready."

He blinked at her as a dead warrior blinks at a Valkyrie.

"You saved my life. How much?"

"There's no charge for saving lives. They are included with the board."

"May I tell you that you are the bravest, cleverest, sweetest girl in all the world?"

"No! You mustn't say things like that to me."

"But can't you see that I love you?"

"I see that you are dripping wet."

She swiftly rowed to his harbor and rested on her oars.

"Can you dress yourself? Shall I send father over?"

"Don't even inform him, please. Do you want me to tell you about Gratia?"

"I don't care a snap about Gratia."

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Marvin shivered till his teeth chattered and the boat shook.

"But—but—she refused me. She didn't want to tie my necktie."

Jean burst into a peal of laughter and sprang from the dory. In two minutes she had a fire blazing before his tent. In another minute she had left the island, carrying his bass.

### Chapter 40. Zirconium

Over the savory chowder Marvin was saucily told that since he seemed to be so deeply interested in food he should have a hot beefsteak for his supper. He replied that he would eat beefsteak if set before him, but that he could not be a party to smuggling beefsteak, and that on no account would he join them on their Canadian ride.

So when at two o'clock he was finally left alone with the dog, he was free to inspect the empty storeroom all he pleased. He made out a list of things that in his opinion she needed, being reasonably sure that she would not smuggle enough to last two days.

Having done so, he set out to find an Indian to play the part of Santa Claus. He rowed up to the pier, left his skiff there, and embarked in the Kittiwake. Beside him sat Agricola, erect and alert.

Soon he overhauled a sail stained red with hemlock bark, but discovered that it contained only a swarthy woman with wild strawberries. A woman would hardly do for his philanthropic purpose, and so he ran on till he was abreast of Keego.

Now Keego was his second destined prize. He was going to buy Keego when he got round to it, and doubtless his father would in time sell it to somebody as a coaling station. It was not pure silica but Laurentian granite, lying for the moment

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in the afternoon sun like so much red jacinth. From its little citadel the rains of countless years had washed down the granite stuff, doubtless with a good deal of zircon in it, and though the west side was rocky, the south and east were composed of coarse sand.

He rounded the curling southern tip where the deep water lay like green jargoon above golden pebbles, and was surprised to see a sailboat lying close to shore. He drew alongside and perceived within it a tall Indian, dead drunk. He studied the sleeper's face. It seemed familiar, and he concluded it was like the countenance on the recent nickel coins. This man might do. He would wait a while and see if this remnant of ruined grandeur waked up.

So he made fast to the sailboat and went ashore. The citadel, with its hyacinthine hues changing under the passing clouds, invited him, and he walked toward it through the waving grass. Just before reaching it, however, he was confronted by a curious object, a little hut or lodge that some hunter, perhaps, had erected to pass the night in.

He approached the door, and paused. Behind him Agricola uttered a short bark.

Instantly a dark young face appeared, and dark young eyes were looking into his. They gazed for a moment, almost with reverence. Then, since Marvin said nothing but only smiled, the boy smiled too, and spoke.

"Bo-jou, Mugwuh!"

"Bo-jou, Little Pine."

It was the merest guess on Marvin's part, but it happened to be right.

"Why did you call me Mugwuh?"

A look of anxiety came over the dark young face.

"You not the Bear?"

"Yes," smiled Marvin, "I'm Mahan, the Bear."

The lad seemed relieved. "My father Ojeeg is down in the boat. What you want me to do?"

The question was so humble, so much like the one which Marvin himself had asked a few hours earlier, that he did not inquire into the mystery of it.

"I think we'd better put him ashore and leave him till we get back. I'm going to the Soo to buy some provisions for the Humming-Bird, and I want you to go along."

The Little Pine obediently picked up a water-worn board and carried it down to the shore to serve as a gangplank.

Marvin walked up the gang and presently emerged with Ojeeg's limp form lying over his left shoulder. It looked to the Little Pine like a great feat, but every soldier knows how it is done. This one came ashore and laid the sleeper down beneath a tree.

The sharp exertion made him a trifle dizzy. He walked up the gang again, swayed across the sailboat, stepped across to the Kittiwake, and plunged head first into twenty feet of water.

But this time he did not lose consciousness. When he came up he rolled over on his back and floated. In two or three minutes he was neatly dragged out on the sand, where he lay with closed eyes and open mouth.

He heard loud whines and felt a rough tongue licking his face. Then a hand drew his own tongue forward, and a resolute finger explored his mouth. He was too thoroughly humbled to object, nor did he mind being turned on his face and lifted in the middle. Next he felt a finger exploring his pulse. By the time his head ceased to whirl he heard the crackling of fire.

So when the Little Pine came back and helped him to his feet, he was ready to strip again and hang his clothes before the blaze. The Little Pine did likewise and went off to gather firewood. Returning with an armful he stopped before his patient and surveyed him critically.

"You fell down this morning. You got red line right across heart. So you do not breathe good."

Having announced his diagnosis, which was good so far as it went, the Little Pine replenished the fire and backed up close to it, like Manabozho when he punished his legs for going to sleep.

They dressed. The Little Pine made sure that his father was comfortable, and then went off to replace a certain piece of white limestone that he had noticed missing from his sister's grave. Some camper had used it for a table, not knowing that the sand was full of graves.

When they had started north, Marvin fell to reflecting on the situation. At this rate he was not likely to live through the week. He could hardly expect Humming-Birds and Little Pines to be on hand whenever he fell into this deadly stream. Humming-Birds charged him nothing for saving his life, but Little Pines might. He put his hand

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into his pocket and drew out two or three dollars in silver.

"Some day, my lad, you are going to be a doctor, and I want the pleasure of paying you your first fee."

The suggestion was ignored, and Marvin put the money back in his pocket.

"Business is business, Little Pine. Remember that you owe the Humming-Bird thirty dollars."

"Me owe her thirty dollars?"

"Yes, for lessons in English. Of course she wouldn't charge you a cent, but even an Indian ought to be infinitely honest."

"Bien, I pay her!"

"That's the right spirit. So I shall buy thirty dollars' worth of provisions and give them to you for saving my life. You will then give the provisions to her. I want you to write her a little note saying that you are bringing her some wood oil in a bottle, and some bacon, and a white sweater, and a few other things. Do you understand?"

"I unders'tand."

"Very good. Put your hand in my pocket and take out a pencil and some paper that you will find there. Then hop over into the waist of the boat and write."

The boy obeyed, and by the time the launch entered the slip he had produced the following memorandum of invoice:

Naynokahsee:

I made quite much money. Naynokahsee is oodyamin and ahmoo-seen-ze-bah-qun. I put white stone over Penaycee, I will put white wool on my sister who lives. I bring

her wood oil in bottle. I bring her lardstick too. I hope my words are spelled right.

—Shinguakonse.

When they came back down the river laden with much booty, Marvin had learned a number of things, including the astonishing fact that Keego belonged to Ojeeg.

"Shall we stop to see if your father is awake?"

"No. Let him sit by graves and think. All chiefs of Crane are there. They not like him to drink. Bien, the Bear will show me how to cure him."

Marvin reflected. When he got round to buying an island full of dead chiefs it would be like requesting the trustees of the Grove Street cemetery to sell him the bones of New Haven worthies to make calcium carbide with. Ojeeg was likely to prove as refractory as zirconium.

At the same time Ojeeg might prefer ethyl alcohol to all the dead chiefs in heathendom. Ethyl can persuade the owner of graves that he is a greater man than any of his ancestors. Nothing like ethyl to put a rosy face on facts, and it is the approved business means of eliminating backward races decently.

The chief difficulty was the boy. The boy was anxious to cure his father, and expected his new friend to help. The boy had even seemed to be expecting him. How could this be? Why had the boy addressed him as the Bear?

### Chapter 41. Columbium

Meantime Jean and her father were spending their four precious hours on Bay-qua-de-nah-shing. They drove from one point to another through the hardwood and the clearings, now stopping to shake hands with some old friend, now pausing to survey some pleasant prospect. At four o'clock they reached the top of the mountain, whence both Canada and Michigan could be seen.

At their feet lay the long southern end of the island, miles on miles of treetops. Beyond it, under the shadows of the flying clouds, a score of smaller islands were visible, and across them the sunlight dreamed of violets.

At the first touch of all this beauty poor Jean felt the tears coming, and glanced back to see if she must hide them from the driver. But he had disappeared. She drew closer to her father's side, and he clasped her with one arm.

He had been there with surveyors whose only interest was to increase the lines of division. He had been there with a historian to show him where the British flag had floated for thirteen years after the peace of Ghent ought to have hauled it down. He had been there with Ojeeg, who could stand for a long time in silence to survey his ancient homeland, but who would be sure at last to say something bitter about the trading posts where his ancestors were deliberately made drunkards.

But the old man had ceased from bitterness. He felt it useless to lament the passing of fox or hunter. He felt it equally useless to lament men's hunger for land. Here he had stood with bowed head thinking of forty youths whom he had slain when land hunger plunged Columbia into civil war. He had done what he thought was right, but that could not save him from the infinite pity of it. He could no more reverse the deed than he could whiten an unhappy mulatto or darken him again to a happy negro.

He had been there in 1879, the year when this boundary was first endangered by the seal question. Till that time men had been content to round up young bulls and knock them on the head, but thereafter women were to be richly clad with skins of mothers. For a time it looked as if this river would be run red with blood of boys disputing the right to kill the unborn, but in 1893 the danger passed, and both sides proceeded to exterminate the race of seals.

He had good hope that this boundary would remain unfortified, at least until Jean's grandchildren were past the age when they might be drafted. He did not doubt the good intentions of either nation.

But there was no more frontier left, and no more chance for the democracy which is possible when land is abundant and farmers are few. Soon these islands would be taken for summer homes by money lenders. Soon industrial uses would be found for these delicate peninsulas. Soon the stratification of classes would set in, with Praetorian guards to pay. This little picture of peace

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was a mere utopia, like the colored perfection seen on the ground glass of a camera.

But for a moment he stood above all history. He was looking down on beauty which is older than the human race and which will last when the race is gone. Before him were spread the kingdoms of earth, not as they ever were, but as he wished they might have been. Long he gazed, looking down on perfect silence, shore on shore rimmed with the intimate sea. The coasts of enemies were blending. Continent faded into continent, as if all the world were one at heart. Nations sundered by mountains and by mutual fear were hid together in the self-same cloud. All human effort seemed united to conquer, but not to ravish, the beautiful and exacting earth.

It was only a wish, but it had power to strengthen him. So one last look, dear as the face of Jean's mother. As he swept the scene with his weak human vision he murmured some lines of Greek—the lines wherein Menander counts him happiest who, before returning whence he came, gazes upon the holy things, the common sun, the water, the clouds. Then beneath the nimbus a great pure beam struggled down, whitening islands so as no fuller on earth can whiten them.

Chapter 42. Molybdenum

Having caught a pike and skinned it, Marvin carried the pearly residue up to Miss Mabel. Then he lingered a little with the old gunsmith, talking about guns and the new alloys of steel. He spoke of meeting Ojeeg, and learned that the chief was usually called Nick.

When he reached home, the doctor took him by the hand. "My son, you gave us a very great pleasure this afternoon. Jean is in the kitchen all ready to cook your beefsteak."

He went on out to the kitchen to be purified of the lingering pike. She led him at once to the storeroom, and pointed out a fine display of stuff, including green peas and a whitefish.

"Wasn't he wonderful?"

"Who?"

"The Little Pine. See this love-letter tied to the bottle of olive oil. It calls me heart-berries and bee-maple-syrup, in other words strawberries and honey."

Marvin sighed with envy and held out his hand. She began his ablution and confided more misinformation.

"He must have met Mr. Gillies, who was on the lookout for somebody going up. And when Mr. Gillies handed him the money he handed it right back. That made Mr. Gillies remember the potatoes."

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At supper he made no reference to the adventures of the afternoon, and nobody made a reference to those of the morning. Evidently the doctor had not heard about the cave. Yet there seemed to be plenty of things to talk about, and even after the dishes were washed they all lingered a while by the fireside. Gradually silence descended on them—not sullen silence or indifferent silence, but the silence of a happy family wholesomely tired out.

So came the end of his second perfect day, that had so narrowly missed being his last on earth. Again he rowed to his island and again he was soothed to sleep by Ariel in the pine tree.

But when morning came and the sun on the khaki above him made him feel like an insect in amber, he began to define the issue. He must broach the subject of business pretty soon.

Which should he ask for first, herself or the island? She already knew that he loved her and had told him that he must not speak of such matters. That was very shy and nice in her, but it was no serious obstacle. The danger was that being so unused to business she might fancy him trying to bribe her. He would take the day off and think about it.

He spent most of the day wandering in the woods, and discovered that Dr. Rich's possessions constituted a little peninsula bounded on the west by an inlet, and that several deer lurked in it. One was drinking from a fire-ditch of running water which was meant to protect the pines if a fire ever jumped the creek. He heard what he thought was a deer along the shore, and found it was only the

lovely Sempronia, and drove her back to the peninsula where she belonged. The cow wore no bell, but he understood why; the doctor did not like the sound of bells. Probably he did not like the sound of launches on the river, and quite certainly he would not like the sound of TNT if Chase Mahan took a notion to make carborundum out of the Duckling!

It was this thought which finally decided his next step. He must make sure of his future wife, no matter what happened to her property. He walked back to her dwelling, rowed across to his own, and spent an hour in literary composition, using her totem for a lap-board.

That evening came the whitefish supper which he had provided for. He hit the doctor just right with that delicacy. He was not informed that they had not eaten whitefish in four years, but he was told the Indian name and all the legends about attik-u-maig, the reindeer of the water.

The doctor was so grateful for this sort of venison, and so appreciative of the way his daughter had broiled it, that after supper he locked them both out of the kitchen and washed the dishes himself. They could hear the clink of china beneath his scholarly fingers, as if he were playing an accompaniment to the song he was humming, about love divine, all love excelling.

"Miss Jean, there are some business matters that I'd like to talk over with you, if you are not too tired."

"I'm not a bit tired, but I'm afraid you won't stick to business."

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"I will. If necessary I will use the word business in every sentence."

Jean thought a moment and then rapped on the kitchen door. "Daddy, dear, Mr. Mahan thinks he wants my opinion on some of his business affairs. Shall I take him down to the Tarpeian?"

The song ceased. "So do, my girl, and if he doesn't behave himself, throw him over."

Jean went to her room and drew on her new sweater. Then she led the way down and sprang up before he could assist her. In fact he was not trying to assist her, for his courage had failed.

### Chapter 43

He lacked the courage to ask her to marry him and then to sell him her silica. No matter how cautiously he might state the case, it would look like bribing her.

Somehow "courage" does not seem the right word. Courage is heart, and in this situation there was too much heart already. We might say that he lacked sand, but that would be too literal. Sand is silica, and to say that he lacked the sand to ask for silica is playing on words. Courage is sometimes likened to red blood, but, alas, the reddest blood is that of suicides who have inhaled illuminating gas.

What this lover really lacked was something like manganese, something to make him perfectly ductile in her hands without losing the hard edge of his commercial intent. There did not seem to be any such element.

But as he leaned against the rock in the darkness he thought of the two documents in his pocket. They were meant to show his sincerity. She was welcome to every cent that he possessed, she was welcome to decide how he should spend his life, she was welcome to make their marriage exactly as much of a marriage as pleased her.

### Chapter 44. Ruthenium

So when she politely inquired, "Aren't you coming up?" up he came, and seated himself as near her as he dared.

"Here is a document I'd like you to see."

He handed her the paper and his electric torch, and she read aloud:

In the name of God, Amen.

I, Marvin Mahan, being of sound mind on most subjects, though somewhat given to dreaming on atoms, do make and declare this my last will and testament, in manner following, that is to say:

First, I give all my apparatus to my father, Chase Mahan, to be given to some school, and ask him to bury me at his own expense.

Second, I give all my books to my mother, Helen Marvin Mahan, and especially the fairy stories that she first read to me.

Third, I give my watch to my brother Charles. It is a good one.

Fourth, I give to my brother Augustus a trinket that is hidden in my safety deposit box. He deserved it from Uncle Sam.

Fifth, I give my clothes to my sister Anita for her disabled soldiers.

Sixth, I give my left hand to my mechanical friend, James Endicott Hogg.

Seventh, I give, devise and bequeath all the rest, residue, and remainder of my estate to Miss Jean Winifred

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Rich, who, discovering me unconscious after a bad fall, saved my life at the risk of her own.

The voice of the reader, which had begun to wobble a little as soon as it struck the reference to fairy stories, wobbled a good deal on the last sentence. She had to wait a minute before she said,

"I'd love to know your sister Anita, and I'm awfully sorry I can't take your rest and residue and remainder. Please give it to Anita for her soldiers."

Marvin slowly tore his will into pieces and extracted from his pocket a second document. This too she read aloud:

This agreement between Marvin Mahan, hereinafter designated as the party of the first part, and Jean Winifred Rich, hereinafter designated as the party of the second part, is in writing for the purpose of satisfying the fourth section of the statute of frauds, and witnesseth as follows:

1. (a) In consideration of marriage the party of the first part hereby covenants and promises to choose such occupations as shall seem good to the party of the second part.

(b) Furthermore, to give, convey, and assign to her and her assigns forever, all property, real, personal, or mixed, of which said party of the first part shall be legally seized and possessed at the time of his marriage to said party of the second part, and all property, real, personal, or mixed, which said party of the first part shall thereafter legally acquire at any time whatever during his lifetime.

(c) Furthermore, to live with the party of the second part in such places and at such times as shall please and suit and be requested by the party of the second part, the purpose and object of his part in this covenant being to secure to said party of the second part the fullest freedom and happiness within the marriage bond.

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2. In consideration of the foregoing covenant and promises the party of the second part agrees to marry the party of the first part some time or other, when she gets good and ready.

(Signed) Marvin Mahan.

(Signed) .....

She had laughed out at the words "in consideration of marriage," but from that point onward her voice was sober.

"It is a beautiful contract, Mr. Mahan. I don't suppose I can appreciate all the consideration it shows."

"Will you sign it?"

"No."

"Will you accept me without signing it?"

"No."

"Is there anything the matter with it?"

"No, except that it is pity gone crazy."

"Jean, you are harder than iron."

She made no reply, but laid the quenched light beside him and looked away at the stars.

### Chapter 45. Rhodium

He helped her down and saw her to the house. Then he retired to his island and lay awake in the dark.

The silence was profound. He could hear the blood circulating in his ears. He could almost hear the trees lifting their tons of sap.

Then the silence was broken by the rustling of squirrels. These were chemical machines that captured energy, stored it, transformed it, and dissipated it. They had eight or nine automatic functions, including reproduction. They drew up no contracts to protect their mates from the blind chemical urge.

From an upbound steamer came an amorous Hawaiian tune. More dissipation. The sun squanders energy. Earth squanders energy. Men squander energy, and have been doing nothing else since they lighted the first fire.

Certainly he had squandered energy that evening, and commonsense advised him not to make love to her again, or to try to buy her island in the morning. But her refractoriness only increased his own. The Anglo-Saxon grit that mingled with his Celtic mobility began to assert itself. He would certainly try to buy that island in the morning.

And now it occurred to him that the universal waste of energy may not occur within the atom. He sat up and thought about it. There in the [192]

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darkling tent he tried to frame some equations that would explain the dispersion of light without upsetting what he believed about the motions of electrons.

Chapter 46. Palladium

Next morning after breakfast the doctor went off to his garden, and Marvin sat down on the porch to wait till something should bring her out there. In an hour she emerged, bearing a blue bowl and his bag of peas.

"I thought you had gone fishing."

"No, I am waiting to buy your island."

"To do what?"

"To buy your island."

"What do you want it for?"

"I don't exactly know."

"Mr. Mahan, you are offering to buy something that you have no earthly use for. That is pity again. You have guessed that the Little Pine's present was needed. But I don't like to be pitied. In fact I won't be pitied."

"I'm not offering pity. I'm offering ten thousand."

"What, for a thing that I pay just about two dollars a year in taxes on? The grammar isn't very good, but it's as good as the judgment you show."

"Well, now, darlin'—that is to say, Miss Jean Winifred Rich—my judgment may be poor, but consider. Look at that object out there in the water. It has a hundred pines worth thirty dollars apiece as they stand, and a hundred more worth half as much. You are selling valuable timber,

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and harbors, and wonderful views, and easy access to transportation. You are selling a perfect site for a summer home."

"I'm not selling anything, Mr. Mahan, but I'd like to ask if you wish to build a summer home."

"Nothing could please me more, but I am not buying for myself."

"Whom are you buying for?"

"I am not at liberty to say."

"What is it likely to be used for?"

He gazed off toward the island, which lay in detailed perfection under the cloudy light. It was unimprovable beauty. Not one fairy foreland or one spray of pine ought to be changed.

"I don't know exactly, but it is composed of pure silica."

"What is silica used for?"

"Silica is used in making glass, porcelain, grindstones, soaps, textiles, polishing-powders, and polishing-wheels."

"Is that all?"

"No. One of its commonest uses is to harden steel."

She looked at him thoughtfully and made the peas pop faster and faster.

"I think, but I'm not quite sure, that you were willing to make love to me to get yourself a steel hardener."

"Jean, you know better. I told you last night that you were harder than iron, but today you are hard enough to serve as a laboratory crucible to melt silica in. You have refused to marry me, and that's all right. But you know I'm not trying to bribe you."

She looked him in the eyes, and then, because she was as honest as he, she recanted.

"I beg your pardon. But one thing I'm sure of. You are willing to let them cut down the pines and blow all that beauty to smithereens. So if it comes to hardness, you are just as hard as I am. But there's one thing you haven't thought of at all."

"What's that, dearest?"

"Explosions."

"Well, for a wonder, I did think of them. That's why I tore up the will. I thought that if he would sell his farm for four thousand, I would buy it and give it to my employer for the quarrymen."

"Oh, that was lovely of you, Mr. Mahan! You really are a dear fellow, and considerate, and thoughtful—but I'm awfully sorry to see you mixed up in business. In the first place, father's poor little place is dearer to him than the best farm on earth. In the second place, you do just what your employer wants you to do. You are too obedient. You came up here to buy that island without knowing or caring what use would be made of it. What would you say of a man who did that?"

"I'd say he'd been in the army."

"But the army is different. In the army you have to trust your colonel."

"It's the same now."

"Then that settles it. You have sold your conscience, and it doesn't seem to trouble you the least bit. I'll go and get your six dollars—"

"My six dollars?"

"Yes, the balance of what you paid me."

"Do you mean I'm dismissed?"

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"I do think you had better go. I'm so sorry—"

She flashed into the house and returned with the money.

But he was gone already.

### Chapter 47. Silver

That is to say, he had gone down to the boat-house and embarked in his skiff. He had no notion of leaving the north country, but was willing to pull up stakes and proceed a few miles up the river, where he would negotiate with Ojeeg for Keego.

Since she had accused him of selling his conscience, it was about time she knew who employed him. In fact it was about time that Chase Mahan should get acquainted with his future daughter.

He would write to his father that the silica belonged to a Miss Rich, who preferred to deal with principals rather than with subordinates. That might bring his father north. And there could be no harm in leaving the age of Miss Rich to be discovered by the grizzled engineer himself.

Some day she would be no longer young, and as he meditatively made his way across the water he lifted up his voice and sang about it—about silver threads among the gold. He knew only one stanza, but it was not really necessary that he should know more than the first word. That happened to be "Darling," a word which can be sung by any voice and at any pitch. Marvin sang it at a pitch of about a hundred and fifty-five, and as the wind happened to be right it reached a certain girl and made her cry.

Meanwhile the doctor, having finished his weeding, had come down to the river to wash his hands.

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As he bowed his white head beside the dock he heard the sound of oars, and perceived that an old friend was coming in.

"Bo-jou, Black Hawk. How is the Red Leaf this morning?"

"I don't know. I haven't seen her since yesterday. But I stopped for your mail on the way down."

Dr. Rich carried the mail up to the house unopened. As he entered, his keen ear caught a sound, muffled and piteous.

The door of Jean's bedroom was closed. He knocked, and, receiving no reply, entered. She was lying face downward on her white camp-bed, sobbing as she had sobbed that April day three years ago. He sat down beside her and smoothed her hair.

"I'm afraid that my little girl has been having words with our guest."

She lifted herself on her elbow and began to speak, though her breath came in short catches, like a child's when it has stopped crying but cannot control its throat.

"Daddy, please go with him and see him off."

"What! Is he leaving?"

"Yes, daddy."

"Did you send him away?"

"Yes, daddy."

"What had the wretch done?"

"He pitied me."

The old man was silent a moment, and then murmured, "O Eros, Eros, thou who blindest! But before I go to see this criminal off, we had better

look at the mail. Here's the statement of royalties. Please open it."

Jean controlled herself and obeyed, but she looked so long and blankly at the account that her father spoke again.

"Will it be as much as last year?"

"No, daddy, it will be less than two hundred—eight cents less."

The news was evidently a blow, but the old man took it quietly.

"Jean, considering how many lads are writing text-books, eight cents less than two hundred dollars is a wonderful showing."

"Father, it is just so wonderful that you'll have to put the mortgage on. You'd better do it today and be done with it."

"My brave little woman, I will. Pledges are the inevitable daughters of loss, as Epicharmus remarked long ago before Roman mortgages ruined the world."

He arose and went to his room for his papers.

"Good-by, my comfort. I'll see Marvin off and be home on the mail boat tomorrow."

He started for the door, but stopped beside the old couch.

"I've had that couch fifty years, and it feels like a map of Macedonia. Do you suppose that hair-cloth can be bought nowadays?"

"I don't believe so."

"Well, I'm going to take a sample and find out."

Kneeling, he clipped away a little triangle. He put it in his pocket, kissed her good-by, and went down to the pier. There lay the Kittiwake.

"Marvin, I wish to go to town."

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"I was just coming up, sir, to ask the favor of your company."

The doctor stepped aboard, and for some time not a word was said. They ran so lightly over the mirror that they seemed four men. All four were still, shadows fleeting between two heavens.

"Dr. Rich, last evening I proposed and was refused."

"Naturally. I warned you that you must give her time. Under the circumstances, I don't think you had better leave us today."

"I'm not intending to leave. May I ask at what price you value your estate?"

"Three thousand."

"Doctor, this morning she refused ten thousand for her island."

"Ah! Did you explain why you wanted it?"

"No, I'm acting under sealed orders."

"I'm afraid, my son, that your orders are as transparent as this water. Your principal is a steel man. I will reason with her this evening."

"Thank you. Meantime I shall be obliged if you will give me a brief option on your place."

"I will do so. But speaking of islands, wouldn't the one ahead of us serve your purpose?"

"I intend to buy that one, too."

"Marvin, I clean forgot. Keego has graves on it."

"So I understand. I should hate to have Ojeeg sell me his graves in order to buy liquor."

"Never fear. You couldn't buy them."

"But wouldn't he sell them to give his son a medical education?"

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"I doubt it. Ojeeg can go into the bush in January and sleep on the ground, but when he comes into his house, he seals the windows and huddles over the stove. When his dearest child was very low with tuberculosis, he brought the jossakeed and let the old fool treat her by incantations. The girl of course died, and Ojeeg's faith in doctors died with her."

"Might not his wife or his mother help me?"

"They would if they could, but they have no influence. I have known his mother half a century. She was a very fine woman in her youth. I remember—"

The doctor stopped short. His old blue eyes turned a little to the west, as if seeking out some spot on the water.

"Marvin, your family name is Celtic for Bear. In the days of Agricola your folks were the Orsini of Britain. Now the Bear is sacred to the Ojibway, and especially sacred to the Crane totem. Address the old woman as the Bright River, and tell her that, being a Bear, you have come for your fish."

Marvin laughed outright at this sudden access of craftiness in a man who adored infinite honesty.

"I'll obey orders, sir, but suppose the charm fails to work?"

"In that case," said the old man, drawing the bit of haircloth from his pocket, "give her this and say that I should be glad if you might own Keego."

"No other message?"

"No."

Dr. Rich relapsed into silence, reflecting that he need not mortgage his property for a few days yet.

But Marvin, holding the bit of cloth beneath his

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thumb and looking straight ahead at the channel, had already forgotten Keego. He seemed to see on the smooth surface of the water the pattern of the cloth enlarged. Then the woof disappeared, leaving only the parallel lines of the warp.

The cloth owed its permanence to the fact that some horse had extracted silica out of oats. Might not the arrangement of silicon atoms in silica be like a hair? Quartz has one atom of silicon to two of oxygen, and it was occurring to him that it stays put by a thread of silicon atoms linked above and below with oxygen. That meant fourteen outer electrons firmly linked with eight. Until he could submit this structure to the test he decided to bind each silicon atom with two added silicon electrons, and then add two oxygens. He thought that would hold the structure a few centuries, or at least until he got back to his tent.

"Do you really wish to go to town, doctor?"

"No."

"Where shall I take you?"

"Why, if you've nothing better to do, I should like to revisit a scene that I have not beheld in thirty years. Up the Echo river there's a bastion of granite that glows in the evening as if all the rains since Deucalion had not been able to quench the molten rock."

### Chapter 48. Cadmium

Jean was left forlorn. While Agricola crowded close to her in silent sympathy, she had watched the Kittiwake fade into a mere silver tern, and felt that this was the end of everything.

Alas! She had not read *The Tempest* for nothing. She knew her natural mate as certainly as Miranda did when she first changed eyes with Ferdinand. It almost killed her to refuse him, and to see him the patient log-bearer of some money-lord, for deep in her heart she felt that nothing ill could dwell in such a temple.

She attended to her work all the morning, but found herself making little mistakes. She prepared some dinner for herself, but could not eat. In the middle of the afternoon she stole away from Agricola and rowed over to the island. To her immense surprise she found the tent still standing. Maybe the dreadful fight would have to be fought again.

She flitted all over the island, now stopping to touch some favorite pine, now standing on the eastern rim to imagine how steamers would look there. By and by she heard Agricola dolefully howling for her, and went back.

She changed her moccasins for old shoes, put on overalls, and went up to the barn to milk. But no beautiful Jersey greeted her. The naughty Sempronia had failed to come home out of the bush. So she returned to the house and changed

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back to skirt and moccasins, wistfully longing for just one pretty dress.

It was beginning to rain, and she might expect to see the Kittiwake returning soon. Even a rejected lover had to eat, and she would make some hot corn bread.

She set the fire crackling to get a quick oven, and sifted some of the Little Pine's snowy flour in with some golden grains. She supposed that the corn meal was cadmium yellow, but why? All she knew about Cadmus was that he was a Tyrian prince who came over to defraud the Greeks in business, and who sowed dissensions that slew all the Horatios.

The time slipped along, the rain fell drowsily on the roof, and at eight o'clock the travelers had not arrived. Perhaps they had motored up the Echo to see the wonderful lake, and were delayed in getting back. She had paddled up that river in her childhood, and could still smell the lilies and the buckwheat, mingled effluences sweeter than sandalwood, and could see the rafts that often delayed a boat.

She sat down and read awhile. She rose and moved restlessly about the house till she found herself in the storeroom, counting her treasures. They had not seemed so imposing at first. Money bought few provisions these days, and this array must have cost something like thirty dollars! The mention of the sum recalled what she had jestingly said to Marvin about English lessons. She studied the Little Pine's note again, and noticed that he said nothing as to how he "made quite much money." The thing began to look suspicious.

Shinguakonse had never told her a lie, but if he had run across Marvin Mahan and been made the tool of compassion, her cup of humiliation was full.

In an hour she could know. She would go to the birch-bark lodge which she had helped build, and wake that boy up.

In a few minutes she had stepped into outer darkness, leaving poor Agricola to whine. Once in her dory she fastened her lantern and tucked her sweater under the deck. She worked her way out into the channel and started north. Her blood was up, the night was dark, and she doffed her blouse. Soon she had entered the old unlighted channel and extinguished her light.

The winding swift stream was no place for an amateur. Many a rock barely visible on a quiet morning will rip a canoe. If you stand on the headland where Ojeeg's ancestors used to watch for bear, you see below you a flowing pavement, dark and uneven, warped and cracked, a street that only the gull can tread. Now it was Jean's business to climb it in utter darkness, but she knew the way. She did not need the gleam of a lantern on a blossom of foam. She could tell by the pull of the current and the sound of the rapids.

She groped along the eastern shore of Seen-ze-bah-cud, and by ten o'clock her right oar, like a fingertip, discovered Ojeeg's sailboat.

She lighted her lantern and tied her boat to a birch that leaned out over the water. Then she stepped ashore, hung her lantern on a hazel, and put on her blouse. The lantern shone in the bush and pinked out the tufted bunches of hazel-nuts,

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and shone on Jean herself as she lifted her rosy arms.

Warm in her new sweater, she seized the lantern and started up a path. Sometimes the light revealed a maple with scars, for the Indian tomahawks his sugar trees. Here it flashed on the yellow of a certain birch which draws on the same mysterious fountain as the wintergreen. Here it glowed on ancient elms. Far above in the blackness their mighty harps hung motionless, waiting like Memnon for the morning. A mile of it, all fragrant and dark and virginal, and the sound of rain on the leafy roof gave way. She was in Ojeeg's clearing.

She moved softly past the house and came to the door of the birch-bark lodge. It was open, and from within came a sudden growl. "Ahne-moosh!" she whispered. A big Eskimo dog emerged and licked her hand in the dark.

Then she called softly, "Shinguakonse!"

No answer.

She threw the gleam of her lantern ahead. The lad was sound asleep on his bed of birch, the deer-skin thongs of which were visible beside the blanket in which he was rolled.

She sat down on the silvery edge and touched him. He started, opened bewildered eyes, and sat up.

"Tyah! Is Mainutung sick?"

"No."

"Is Mahan drowned?"

"Not yet. But your question explains everything. He fell in again, and gave you money for

pulling him out. Do you have to be paid for saving life?"

The boy looked at her flashing eyes and sank back on his bed.

"Shinguakonse, don't think me ungrateful. See, I am wearing your sweater. We give you lessons because we love you. And because you love Mainutung, you shall bring him some deermeat as soon as the season is open. How very, very pretty your lodge looks."

## Chapter 49. Indium

She rose and moved to the door, where she stood gazing into the darkness till the boy had slipped into his clothes.

"I am glad Naynokahsee she like my lodge. It is medicine for my father. It is like what was on Keego."

"My brother, I'm afraid it is little use to recall those days."

"My sister, when a man he get sick, medicine man he must know how that sickness it come. You will listen?"

"Yes, Shinguakonse."

"Suppose voyageur come to Keego on snow-shoes, 1832. He see hole in ice and red on ice and know it good place to fish. He walk up bank and see woodpile and two three barrel salt fish. He see bark lodge, nice clean blanket for door, lift up, go in. He see this room, everything like this. Old head-dress of eagle feathers; nice mats of cedar; big cedar bag full of wooden spoons; many nice moccasins; nice chest painted red. He see much dry deermeat, one barrel meal, one bag dry blueberries, one makkuk maple sugar. He see three kettles, one rifle, one shotgun, one bullet-pouch, one shot-pouch, one powder-horn.

"Bien! He see man and woman, young, no baby. Man say 'Bo-jou, neejee, sit down, eat!' All kind fish, deermeat, corncake, blueberry,

sugar. He stay all night, sleep fine, in morning eat again. No charge. Indian glad.

"Next spring that Indian come out of lodge with big pack furs. He go to post to sell. Trader give him glass of cider. Bien, Indian ask for more. That trader put long straw in another barrel. 'Come, Chief, it is whole barrel of cider.' But that cider—you unders'and. It is wassamowin, the lightning.

"Two more years. Voyageur come back to Keego, look round in lodge. No mat, no chest, no moccasins. Nothing to eat. No gun. Chief drunk on ground. Woman tough—dress all open—baby drinking—milk no good. Bien, that baby my grandfather.

"Is it strange my father Ojeeg is caught in a trap? Is it strange he is sick? But I cannot cure him. I am not big medicine. The Sioux are the weaklings, but they have the big medicine. They have the winner, Dr. Ohiyesa Eastman. Once we lick 'em bad, the Bwan, now they lick us."

The Little Pine folded his arms, and Jean spoke.

"My brother, I don't believe that even Dr. Eastman could cure your father. Some day you will find him frozen, and you may as well get ready to face it."

"My sister, I will not let my father die. I will sell my gun. I will go on the fire-jemaun to Chicago. I will be a doctor."

"You can't do it. Let me think."

The lad stood waiting to hear.

"Little Pine, I have been cruel to my father. This morning I had a chance to make him comfort-

able for the rest of his life, and I refused it. But I will refuse no longer. I will help you both."

The Little Pine smiled. "Does the Humming-Bird pick money out of flowers?"

"No, but I will sell my island. I will sell Shingebiss."

"Not for me, my sister."

She looked at the set line of his thin lips and saw it was no use. She listened for the rain and found it was no longer audible on the roof of the lodge. So presently she sprang up and started homeward. The Little Pine extinguished the light and followed in the intense darkness. Not a word was spoken till they came to the river.

"Naynokahsee, who buy your duck?"

"Captain Mahan is willing to buy it."

"A bear, he not eat ducks."

"Perhaps he will sell it to a fox."

The boy pondered in the black silence.

"I not unders'tand. Yesterday I think that bear he come to help the Crane. Now all is dark—like this."

"Yes, it's pretty dark. But the world will be just as beautiful in the morning. After they have put the sand over the last of your family and my family, the sun will rise just as beautifully as it ever did."

Shinguakonse was not unacquainted with this curious form of comfort. His dear teacher had dealt it out to him before, but it took him a long time to see any sense in it.

He felt along the shore until he found her dory, and launched it and held it while she stepped in.

"Tell me how he come up, the sun."

“Why, first there is a color like miskodeed, the spring beauty. It touches the pines on the hill and makes them glow like the lodge of the reindeer, where Penaycee is now. Then the dark blue grows lighter, as if you could see the Bluebird again. Then the stars go out, because the Yellowbird that is coming is so much brighter. Then the thrushes begin to sing. Then—”

“My rifle he go peep peep!”

Jean laughed and pushed out into the dark.

Chapter 50. Tin

The rain-swept Kittiwake rounded the red-light buoy and checked down.

"There's no light in the house. She has milked the cow, and eaten her supper, and gone to bed like a good girl."

"Doctor, she doesn't expect you home tonight. My tent is waterproof. Come and sleep on the ground."

So they crept into the harbor and thence into the tent. The doctor stripped to the skin, rubbed his wiry old muscles dry, and suspended his dripping weeds, uttering an appropriate remark from Horace.

He clad himself in Marvin's other pyjamas and wrapped himself with a blanket, but not till he had taken from his wet coat a precious little amulet to dry it. It was a perfect thing of its sort—a tiny gunboat done in pine and colored.

Meantime Marvin had kindled a fire of pine cones under the projection of the tent-fly. He got out some pilot bread, and made some hot chocolate. He spread his little feast on her totem board, and they ate with Homeric gusto.

Later they crept under the blankets.

"This makes me think of old times. My father sometimes took me with him on his prospecting trips."

"Marvin, it makes me think of old times, too. But Horatio often came to bed half crying with the fatigue of the day. When you have children of your own you will know more about paternal love. Sometimes a little boy needs to be comforted. Think of it! For a time you stand like a god, your knowledge unquestioned, and comfort comes by comforting. For sheer earthly joy, I could wish to have Horatio sobbing on my breast once more."

There was silence in the darkness, while the rain fell drowsily on the tent.

"Father Rich, I must let you sleep."

"And I must let you sleep. You will have a busy day tomorrow. I do not envy you your transactions with Ojeeg. You will discover that you are attempting to bridge centuries. It's a long way from hunting to power-farming. He hates us all—especially the churchmen. Which reminds me that the only Black Robe whom he ever tolerated was a priest named La Hogue."

"La Hogue?"

"Even so. He was a vigorous old chap, named from the French cape whence his family came, and you should not confuse him with Hogg. Some Hogg's are Hugos, which means intellectual, but some are La Hogues."

The next thing that Marvin knew was odor. He smelled coffee. So he sat up and rubbed his eyes.

"Well, captain, will you have a cup, with canned milk? Little did Agricola imagine the possibilities of the stannum he saw in Britain. I like canned milk first rate."

"Then I'll leave you some. And I'll leave you my skiff to take it home in, and cache all my gasoline except one can. I'll be back on Monday after seeing what effect haircloth has on Indians."

After the coffee and hardtack, Marvin tidied up his camp ready to depart.

"May I leave you fifty dollars to bind that option?"

"Not a dollar. Hidden in my hollow log are pieces of gold that Jean knows nothing of. They were sent to my children by a friend of their mother's down in Connecticut."

"Doctor, do you think I've sold my conscience?"

"Marvin, don't talk like an ass."

"But she thinks I'm too obedient."

"Obedience saves most men, as Sophocles long ago remarked. But we see her point, and I'll talk to her about it."

### Chapter 51. Antimony

As the doctor was about to leave the island he heard a distant bark, and saw Agricola emerge from the cedars and come tearing down to the boat-house. The dog caught sight of him and plunged into the water. He gained the harbor, dashed up the rocks, and shook himself into rainbows. He panted and whined, and finally seized his master by the sleeve.

"Calm yourself, boy. If you had a few sweat-glands, you wouldn't pant so hard."

He rowed the dog across in Marvin's skiff, and followed him into the woods. Having mounted the hill and descended past the garden, Agricola sprang across the fire-ditch and continued into the balsams.

When at last they reached the creek, the man was panting as hard as the dog. The creek was wide at that point, and Agricola looked back inquiringly.

The scholar hesitated, but since he thought that some child might be in trouble, he answered the look.

"Go on."

And on they went. The man had to take a stroke or two before they made the other side. The woods now were almost impenetrable, but Agricola wedged his way under. The doctor's wet clothes

scraped the leaves from the mold, and moss from the logs. Repeatedly his gray shirt was torn by stilettoes of balsam. At last he could go no farther.

"Wait a minute."

The dog stopped but continued to whine.

"Keep still."

Agricola closed his red mouth again and again, trying to swallow his noise, and in the intervals the doctor listened. He heard bits of cone falling from the lips of red squirrels. He heard the feet of nuthatches against the bark. He heard the borers in the balsams, grinding slowly. He heard a far-off elfin whistle of the government boat coming down to supply the buoy with new tanks of gas.

And then he heard a moan.

He noted the direction and crawled forward. Stumps of pine slowly crumbling. Fallen trunks slowly flattening into earth as a dead body flattens. Thick humus, with black pine needles like crystals of stibnite. Great trees, snapped off and piled above him.

Now a deer run. A spring was ahead, and presently there would be a clump of alders. Then, close to the ground, he caught a glimpse of fallow. With great effort he rose to his feet and looked.

His own Sempronia! She was only three years old, and stone dead. The bullet had taken her just behind the slender haunch that Marvin had noted.

Across the body lay the form of the Little Pine, with his arms around her neck. He had ceased to stroke her, had abandoned the effort to call her

back. Only there came at intervals the moan, tearless and hopeless.

“Shinguakonse!”

As the lad lifted his arms from the dead body his whole frame shook with a shudder of terror.

“Good shot, my boy! I couldn’t have done better myself.”

Then the old man knelt and gathered the Little Pine to his heart.

“My dear chap, I understand. You were not content to bring groceries—you wanted to bring her a deer too.”

The boy moaned something in his own tongue.

“Of course not. Mother wouldn’t understand, She never killed a deer in her life. I’m the chap that understands.”

The Little Pine lifted his face from the doctor’s shoulder, but the look of despair was not gone.

“I kill your only cow.”

“You mean, sir, that you have killed only a cow. You have killed one cow, but I have killed forty boys. The first one I killed was up in a tree. He fell exactly as a squirrel falls, hanging on to the last, and I laughed. Then I got to thinking about it, and laughed no more. I lay on the ground, sick as a dog, and made up my mind I would never have a son.”

The boy laid a hand of sympathy on the old man’s arm.

“Little Pine, do you remember that your grandmother always called Horatio the Gray Squirrel? And do you remember how he held you by the

hands and let you walk up him? And do you remember how your Noko laughed and said that the pine was climbing the squirrel, whereas the squirrel should be climbing the pine?"

The boy smiled sadly.

"Well, I want you to do something in memory of Horatio."

"Yes, my father."

"Then we will carry Sempronia down to your canoe, and you shall paddle round and meet the Aspen, which is just now coming down to fill the black buoy. I will give you a note to the captain, and he will sell the carcass, and you shall save the money to go to school with."

Tears at last burst from the stoical young eyes. This was his punishment, this gift from the man he had ruined.

"I take her to Sault myself," he sobbed.

"There, there, Horatio, stop crying. You seem to have forgotten all your Greek. When Plato said that a boy is the most unmanageable of animals, his best pupil retorted that a boy is more likely to do what is right than what is politic."

"I not Horatio."

The old man brushed his hand across his eyes.

"So you aren't, but it's all the same. Horatio must have sent you. Comfort comes by comforting, as I told Mahan last night."

"My father, I know Mahan. My brother sent him to me."

"What's that?"

"I was fasting. My Noko told me to fast. A fasting boy may see his guide. I prayed. I heard

a noise like the noise of Mugwuh, the Bear. I looked and saw Mahan."

Dr. Rich received this primitive stuff in respectful silence.

"My father, I not think medicine man can sit in lodge and make Penaycee well by talking to the lightning. I not think what Pere La Hogue told my father, that antimoine he cure all. But my brother sent the Bear,"

### Chapter 52. Tellurium

The chemist reached Ojeeg's landing supposing that the chieftain's estate extended to the shore. It had, originally, but most of it had vanished down a throat. Just now however the owner was sitting in his sailboat perfectly sober, and looking as if he owned that land down to the centre of the terrestrial sphere.

"Bo-jou, bo-jou, Ojeeg."

The salutation was not returned.

"May I camp for a day or two on your land?"

"No!" And Ojeeg proceeded to light his pipe.

"I am willing to pay for the privilege," said Marvin, and handed over a five-dollar bill.

The lighted match was still in Ojeeg's hand, but the pipe was not yet drawing well. So he took the money, ignited it, and used it to spread a broad flame over the tobacco.

But the buyer rose to the occasion. He extended his hand for the blazing paper, and lighted his own pipe.

"Ojeeg, I ran up to see you about Keego. I'll give you a thousand for that useless chunk of rock, and I have a hundred in my pocketbook to bind the bargain."

"You take your pocketbook go to hell."

The savage had learned this trite expression from Christians, for no unconverted Indian swears. But Marvin made no motion as if departing for hell.

He merely sat down on the pier and began to whittle a stick. It was a green sapling with a heavy root upturned by the flood. He trimmed the root, shaping it to look like a warclub, and felt a strong desire to punch Ojeeg's head.

For some time the silence was complete except for a kingfisher, who now and then wound his clicking reel as he darted from his perch.

"You come here to rob me, you land-hog."

"Nick, you are a liar."

Ojeeg rose and disembarked.

Marvin dropped his club and stood up. He stepped forward, willing to take the first blow. He got it promptly enough, and went reeling into the hazel bush where Jean had hung her lantern. He came back and delivered one good uppercut, in return for which the Indian landed square on his heart.

The savage stood over him and grinned.

"You break three hundred treaties. You make my grandfather drunk, you keep him in debt, so you can hang silver fox on white bitch. You take my corn-patch. I say get out. You call for troops. You shoot my dog, my baby, my wife."

Marvin staggered to his feet and hung on to the hazel.

"I am going up to the house and speak to that wife. If she wants some money so that she can leave you, I'll give it to her."

He picked up his club and disappeared in the woods.

Ojeeg reciprocated. He stepped into the launch, lifted the can of gasoline, and emptied it into the swift stream.

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Marvin kept on till he reached the clearing. There he perceived a seated woman, weaving a mat. Before her were two sticks driven into the ground, the fabric of cedar strands between them. She was an old woman, massively built, and her neck was disfigured by a goitre. She was evidently Ojeeg's mother.

"Bo-jou, bo-jou, Bright River."

The woman lifted her eyes. In one hand he held his pipe, in the other his club. The pipe and the club were the sacred marks of the bear totem.

"I have come for my Fish."

The old woman did not seem surprised. Her grandson had informed her of the answer to prayer.

"You come back this evening."

"That's a long time to wait."

"You come back this evening, Mug-wuh."

With perfect dignity she lifted the web once more. Marvin faced about and returned to the shore.

"Chief, you will see me again this evening."

In reply the chief deigned to express his views on the land question.

"My grandmother not for sale."

"Chief, the sentiment does you credit. But I am willing to disinter your grandmother, and bury her again wherever you direct."

Ojeeg contemptuously picked up a handful of mother earth and held it out.

"My grandmother, Noko."

"Ah, I get the point. Say on."

"Land, she can't be sold. Manabojo he make her for his uncles. He make her out of pinch of mud, one little island. He put mouse on her, she

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grow. He put muskrat on her, she grow. He put fisher, crane, bear; she grow. He say, 'My uncles, you not sell. Land will grow forever.' Then *you* come. No room for us. Get off the earth, you God-damn Injuns. Bien, old Nenbojo go away, sit beside frozen chigomee. He will come again. Where his foot touch land, fire will jump. Every damn land-hog get burned good,"

### Chapter 53. Iodine

Marvin embarked and departed. He did not understand such references as "chigomee," which was Ojeeg's abbreviation of Gitchie Goomee, Lake Superior. Long before Ojeeg's ancestors came to Keego they had dwelt along that sweet ocean, content with maple sugar instead of alcohol, and feeling out copper to make themselves pans. They found sprays of it in rocky banks where water had made it visible. They felt it out on On-du-nog-o-ning, the place where one feels for the dishpan.

But Ontonagon was two hundred miles away, and Bruce Mines only ten. It occurred to the chemist to run down there and see if the rock was still yielding either 27, 28, 29, or 52.

In half an hour he emerged from the north channel into Lake Huron, and cruised along the eastern shore of Bay-quah-de-nah-shing. It was all very beautiful, and he made up his mind to return that way by moonlight. He would run southward the eastern length of the island, pick his way westward among the smaller islands, and come back to his tent with the procession of upbound steamers.

Then he turned his prow northward and made for certain smoking chimneys on the Canadian mainland. Bruce Mines received him kindly and gave him some dinner, but was sorry to report that the copper vein had given out, and that the smoking

chimneys merely meant trap-rock being quarried.

The steps produced by lava-flows easily held his attention all the afternoon. It was between them that copper had been deposited, apparently by rains.

Yet here and there on the trap were masses of limestone. Once seaweed had floated here, rich in iodine, that precious non-metal which is twice as heavy as copper and a thousand times more valuable, because it will keep a man alive when any of a dozen diseases attacks his cells.

After supper he once more embarked on Lake Huron. It seemed as wide as the ocean, but failed to smell like the ocean. He reflected that the ocean contains some sixty billion tons of the salts of iodine, and that even the odor of kelp brings food into the human body. The Bright River's thyroids were starving for a smell of oceanic violets.

The sunset was still glowing when he reached Ojeeg's landing, but it set up no such glow in his heart as did the unexpected voice that greeted him.

"Good evening, Mr. Mahan. I'm rather disappointed to see you, but I ran up to tell the Little Pine that I dote on canned milk."

Marvin landed.

"Darling Miss Rich, why should your taste amuse a Little Pine?"

"Because he killed our cow. He wanted to bring us a deer, and Sempronia got in his way. A new cow will cost about two hundred, and I'm going to let you pay for it. You may have my island if you won't ask Ojeeg for his."

"How did you know I was after Keego?"

"Ojeeg told me."

"I'm sorry not to be able to oblige you. I am going up to the house this minute to close the deal."

"Then I'm going with you and try to ruin it."

They walked up to the house and were admitted by the sad little wife, who had been named Little Red Leaf by the Red Leaf herself, because she had started life as a very rosy baby. The roses were all gone now.

They were conducted into the front room, where Penaycee had coughed her life away. There sat the Bright River, Wassaja-wunquay, and beside her the Little Pine. The old woman's face was weathered like the granite she dwelt among, but a pencil of sunlight swept across it as she saw the Humming-Bird approach with the Bear.

Marvin and Jean seated themselves upon an ugly red plush sofa, and sat there in silence as if waiting for a funeral to begin. Presently in walked the man that was.

The Bright River beckoned to the Humming-Bird, and Jean went over and let her whisper something. It was to the effect that the English letters l and r were too hard to pronounce, and that the Humming-Bird must translate.

Then the Bright River began to speak in Ojibway, very slowly, as the ice begins to move in the spring. Jean translated paragraph by paragraph, keeping the dignity of the original as well as she could.

"This man has appeared to my grandson at the moment of his fast. Therefore I will listen to what he has to say."

"Then," said Marvin, "I will say this much. I will pay into the hands of Miss Rich the sum of

four thousand dollars to be held in trust for the use and benefit of the grandson."

Jean opened her blue eyes wide with astonishment, but translated. The old woman inclined her head and asked a question.

"She wants to know what you expect in return."

"Nothing. It is a gift."

Again the old woman inclined her head.

"Ask my son if he will give the Bear a Fish."

Jean turned to Ojeeg, who smiled at her but shook his head. His mother showed no surprise.

"I have been thinking," she went on, "of another island, the one called Mackinac. There were slain the first men ever slain. They did not perish through the hate of brothers. A boy shot his aunt, but he did not mean to do it. With that first woman fell all her family, for what slays one slays many. Manabozho raised them from the dead, but dwarfs they remained, misi-nim-auk-no-go. When a storm is coming, they dance upon the cliff to warn the sailor. Therefore is the island Mishi-nim-auk-i-nong. But me they did not warn."

When this was translated, the old woman sat in reverie, as if she had forgotten her intent. So by and by Marvin took something from his pocket and advanced toward her.

"Here is a bit of cloth. Mainutung sent it to the Woman of the Bright River."

She took the scrap in her fingers and looked at it long. Then she looked at the Humming-Bird and seemed to understand. Mainutung wished to give his daughter in marriage, but had no present for the bridegroom. The best he could do was to

demand Keego for the Bear, and she recognized Mainutung's right to demand it.

"My son will pay his debts. Once I told him how he came upon the earth, but he has forgotten. It was in the early spring, forty-nine years ago. We had been to Mackinac and were returning on the ice. I was in a sled with Wayish-kee, my first-born, and my husband Ussaba was drawing the sled. My son Ojeeg was not yet born, but I was nearing my time. At Point au Frenes it began to snow. I laughed and told the baby that Pupuk-e-wiss was gathering hay to keep his children warm. But the snow turned to sleet and blinded us."

Jean translated this long speech in a low voice, while the old mother clutched the piece of cloth to her breast.

"I sang no more, for I was in pain. I shut my teeth. Ussaba staggered on, unable to see a rod before him. The wind howled like ghosts. Then the ice broke beneath his feet, and he went in. He clung to the ice and cried, 'Au secours!' I was frightened, and my child was born.

"I thought my man would die and my child would die. All was dark before my eyes. Then I felt the sled move back. I could hear some one helping Ussaba out of the water. I felt warm young hands, strong like a man's, gentle like a woman's. Then I went to sleep.

"When I woke up, I was lying on a nice smooth bed. It was made of a horse's hair, and it sprung like a bed of boughs. My new baby was on my arm, safe and warm. Ussaba lay on the floor near the fire, his feet bound up with linen. At the foot

of my bed sat Mainutung. His face was smooth as any Indian's, and his eyes were laughing at me.

"How far can a man hear from the north when such a storm is blowing from the west? He cannot hear a moose bellow ten rods off. Yet my son's baby voice was heard for half a mile. Now he hears the voice of Mainutung asking payment—an island for a life."

Ojeeg rose to his feet and spoke with equal dignity in the same language.

"Ningah, I am not deaf. When the Keen Ear needs Keego for himself, he shall have it. When he needs these hands, he shall have them. But this thief is not Mainutung."

And having delivered his ultimatum, Ojeeg sat down.

"Right you are," said Jean. "The Fisher has told the truth."

"The Fisher!"

Marvin's startled voice rang out as if he were once more in France.

"Certainly. Ojeeg means the Fisher. One of his sons is the Little Pine, the other died in the war. That was Ozahwunoo, the Bluebird."

Marvin sat speechless.

But on hearing Jean's reference to the Bluebird, his grandmother took up her parable in the difficult tongue.

"One good doctor worth all dead bones. Ozahwunoo not there. Ozahwunoo here!"

The Little Red Leaf gave a frightened glance toward the window, as if she expected to see her tall son standing there in a spectral blue light. But "here" did not mean the window. The old

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woman's fingers were suddenly busy at her own bosom. She drew forth a little pouch, opened it, and beckoned her grandson to her side.

"Read, Shinguakonse. I have kept them eleven moons. I not speak of these to a drunkard."

And Shinguakonse read aloud from a blood-stained scrap of paper which Marvin recognized as a leaf from Gregg's notebook:

Noko:

Ah-pe-go, ne nun-duh-way-ne-mah Shingua-konse  
ge mush-ke-kee-win-ee-ne-wid, o-be-mah-je-uan be-  
mah-de-ze-win, kamah pun-ge-sha shoon-e-yah, kamah  
gaween.

Neengah, ne-bo-win way-ne-puh-wud.

Ozahwunoo.

Grandmother:

The Little Pine must be a doctor, and must save  
life for little silver or none.

Mother, to die is easy.

The Bluebird.

Then the Little Pine unfolded a larger letter and began to read in English. But Marvin, with a tremor in his voice, interrupted.

"Wait, boy. I can tell you how that letter is signed. The name is C. C. Gregg, First Lieutenant."

All eyes turned on the speaker. He arose to his feet and held out his left arm.

"The shell that killed the Bluebird hit me first. I am his captain. When I get this lump out of my throat, I'll tell you all about it. But this I'll tell you now. The Bluebird was a man. I don't ask to be any more of a man than he was. I won't say another word about the island. I'll tell my principal that he must take something not so good or

none at all. And I bind myself here and now to put the Little Pine through medical school."

With that he was about to sit down, but he was not quick enough. Ojeeg had him by the hand, and he felt the grip of the muscles that had knocked him down that morning.

"Keego yours. You my brother."

Then Shinguakonse came and looked up into his eyes. And the Little Red Leaf came and took Pat in her hand and pressed the poor thing against her heart. But Jean had her arms around the old woman, and was crying against the goitre and the swarthy face that beamed, for summer had dawned on the Bright River.

### Chapter 54. Xenon

Marvin was overjoyed when his love consented to return with him. She even made no objection when he slipped round the head of Bay-quah-denah-shing and headed south in Huron, announcing that he proposed to run the length of the island, round it, and bring her home by the international channel. It lacked only one night of being full moon, and the whole world was flooded with silver.

"Mr. Mahan, this is just like being on the back of a bird! I never felt anything so entrancing in all my life. And what you did tonight saves me from having to sell my island. Did you and Ojeeg fix it all up?"

"We did. Within a week you will receive a check as trustee for four thousand. The next day the chief will deed me Keego for one dollar and other good and valuable considerations. What's the name of the island ahead?"

"Fox. I've seen it on the map. Oh, how I've wanted and wanted to come around here! See how silvery the beach of it looks."

"Yes, ma'm. It's begging for a honeymoon tent. And you owe the sight of it to chewing-gum."

At this remark the launch remembered its owner, and stopped.

Marvin sprang over into the waist and lifted the big can. It came up like a feather. He shook it

in amazement, and not the slightest swishing was heard.

"Jean, we are stuck. The chief and I had a few words before the armistice, and he has lightened our fuel for us."

"But we have the dory."

"So we have. Do you see any lights on shore?"

"I can't say that I do. Everything is solid black woods."

"Well, I'm ready to row. Kindly move over to my seat and take the wheel. Where do we go from here?"

Jean took the wheel and shut her eyes to think.

"Marvin, it is much nearer to go south than to turn back. You paddle and I'll steer."

For a time it was pleasant to dip the long oar in pure silver, but to change sides was difficult, and there was no give or play in iron Maisie. It was like paddling a liner.

Inch by inch he drew near to the southern end of the great island, covered with the unbroken forest the tops of which Jean had surveyed from the mountain. The shores were full of mysterious and lonely bays, and presently he saw his own namesake shambling along a moonlit bit of sand.

He rounded the southern tip and made his way among innumerable islands, getting shorter of breath every minute. Finally he gave out and had to lie down on the floor to relieve his heart.

She left the wheel and came to him.

"Dearest," he gasped, "that contract is still in my pocket."

"Never! Why, under that contract you'd work yourself to death for me."

She seized the ten-foot oar and kept on paddling for half an hour. Then she stopped to scan the northern silhouette.

"Look, Marvin, the chimney of the old fort! I've simply got to climb that hill and see what else is left. You can stay right here in the harbor, but you mustn't disturb the canoes coming in with bales of beaver. You'll see me up there with the ghosts of the British lads who died here of scurvy because rich folks like furs."

But Marvin would not let her try it alone. He brought the launch up, took some blankets and a lantern, rowed her ashore, and made the dory fast to a single post, all that was left of the ancient British wharf.

When they had barely landed, the woods above them began to hum with a sudden northwest wind. As they mounted toward the crest it became a gale that seemed to threaten even the ancient limestone chimney.

They went back out of the wind. Here had stood the block-house and yonder the magazine. Here was a grass-grown pit, and there—

Their hearts stood still, for something had risen before them. A deer had sprung out of the earth. Then another. The horns of the buck gleamed as he passed the ruins with a bound. The doe melted into the moonlight.

"What a lovely sight!"

"Honeymoon couple," said Marvin unsteadily.

She paused on the brink of the deep hollow, and then fluttered down into it. At the bottom the grass was still warm.

"Come on down! There isn't a bit of wind."

He obeyed her, and spread a blanket for her.

"Now tell me you'll marry me."

"No."

"Jean, do you love me?"

"If I did, I wouldn't tell you so here."

"Jean, do you love me?"

"Well, if you simply have to know, I guess I do."

"Thank you very much. Now I'll get up on top of that wall where the cedars are, and light my lantern, and wave till some launch sees us."

"You'll do nothing of the sort, Marvin Mahan, because I'm never going to marry you, and because you'll freeze to death up there. You'll just sit here and keep me warm."

"Never going to marry me? Whatever put that into your head?"

"I'm not going to tell you."

"Is it because my father has money?"

"No."

"Is it because you don't trust me?"

"No. Stop shivering that way. I can't stand it."

"Is it because you think I'll sign anything I'm told to sign?"

"No, though I think your principal is cheating widows."

"You believe that and yet love me?"

"Yes."

Marvin set his teeth and was silent for some minutes. Then he picked up the lantern and lighted it.

"Lie down and let me cover you up."

He tucked the blanket round her and whispered,

"Good night, beloved."

"Good night, my very dearest friend."

He climbed out of the warm nest, faced the wind, clambered up a limestone wall by the aid of a cedar, and set himself to watch the water. But the lantern could not stand the gale. The light did not last a minute, and so he hung the whole thing in the cedar.

There he sat all night, shivering with passion and with frost, and watching the channel.

Not till dawn did he hear anything like a launch. Then just as the eastern clouds revealed a strip of gold, there stole upon his ear the pulse of an engine. It was feeling its way down the coast from the northeast, as if searching every bay. By and by a green light approached his own port light and stopped.

Chapter 55. Caesium

Far below him the alders parted, and a woman's form appeared, with a basket on her arm. The light was dim, but not too dim to reveal the woman's autumnal vigor. She mounted slowly to his very feet, and stood smiling up at him.

"I am Moira Jamison."

"Your grateful servant, Miss Jamison."

"Where is she?"

He numbly descended and led the way. There lay his young love, asleep at last, the sweet dawn just touching the forbidden lips.

He helped the Red Leaf down, and she kissed the sleeper awake.

"Goodness gracious! Is it you? How in the world did you know?"

"Why, the patrol was hunting for Captain Mahan to give him a telegram. Ojeeg had to confess his sin, and he came very near being murdered. But Captain John came home and told his mother, and she sent her husband down with the telegram and with me. You see the advantage. If anybody dares to breathe a word against my Naynokahsee, he'll have to breathe two against the old Red Leaf."

Jean was presently off down the hill to thank George Gillies, leaving Marvin and Moira alone.

"Miss Jamison, what can I say to Dr. Rich?"

"Nothing. He knows that I'm your sufficient chaperon."

She looked it. She sat there in a hole, but the sun had spied her out and was fitting a coronet to her coronet face. Her back was as straight as the ramrod in the rifle that her Indian ancestor used at Quebec. It was in the loyal arms of that ancestor that the lord marquis Montcalm died.

Marvin went down into the rifle pit and helped her up, and together they descended to the river's edge, where he received the telegram from the Scotchman's hands.

He read it aloud:

Proceed by first train to Montreal. Destination Southampton. Instructions and passport at my banker's.

Chase Mahan.

"Is that your father?"

"Yes."

She flushed a little and turned to Mr. Gillies.

"When does the next train for Montreal leave the Canadian Sault?"

"About a minute past noon."

There was plenty of time, and so they all had breakfast. After that they returned to the Duckling, where Marvin committed to the Scotchman both the launch and the tent, the one to be delivered in due time to its owner, the other to be struck for the present but pitched again when the camper should return.

The doctor smiled at the adventure and went with them to see the traveler off. Marvin sat silent beside the Scotchman, but he could hear behind him the laughing voice of the girl he loved. She

was utterly different from the stranger he had tried to fathom the night before. With exquisite swiftness she met every thought of the Red Leaf and of the old scholar, combining with them both.

At the foot of the rapids all the party except her said good-by and waited in the launch. But she walked up with him to the station and stood waiting while the train approached from the west, advancing through mid-air against the blue sky and above the white foam.

"Ojeeg's affairs will proceed as planned."

"Won't it be splendid! The Little Pine will be off to school before you get back from England. Sometime, several years from now, you must come back to us and see how he has grown."

He took her hand, and the warm electric mystery flowed through them.

"Jean," said he softly, "you ought to melt right now."

She shook her head, her eyes brimming with tears.

Chapter 56. Barium

Naturally the thwarted man's first days at sea were passed in heavy mood, but nothing could alter his determination to win her sooner or later. And nothing could deprive him of the silent comfort of the sea. Its general color was grimly dark, but near the prow it was like a low-flying bird, all springtime beryl and celestite. A little farther out it became translucent olivine. On it the sunlight played in rainbows, touching the foam into pink calcite or winy fluorspar.

By and by he sought the ship's doctor and had his heart examined. It proved to be normal again, but as he continued to ask questions about heart disease, the physician referred him to a work by one Sir Clifford. Just now Sir Clifford was taking care of a certain famous old baron who was about to die. The heart of Lord Fortinbras had served him well, but was worn out.

Had Mr. Mahan ever read Lord Fortinbras' book of travel—the one based on the log of his yacht? Mr. Mahan never had, but would do so. The fact was that Mr. Mahan's instructions were sending him post-haste to get the signature of that same old baron before it was secured by death or a Chicago lawyer named Brinkerhoff.

He had never seen a lord. He had been advised by Dr. Rich to be a good lord himself, but that was a figure of speech having no reference to lords terrestrial. He had small doubt that when he should come to address a baron he should make a fool of himself.

The sweet salt days sped along, and the shores of England appeared. That meant the home of Moseley. Yet why should he single out one name or one country? He no longer saw nation pitted against nation, but the race pitted against the reticence of God.

To Marvin the advance of physics and chemistry was the most exciting thing on earth. The researchers were watching each other, checking each other, helping each other, bound to tell the exact truth no matter where it led. The two sciences were steadily becoming one science, and the great advance continued day by day as if one infinite reluctant mind were slowly revealing itself.

He longed to visit certain laboratories, especially one at Cambridge and one at Manchester. Thomson and Rutherford were like scouts on the advance line.

When the steamer was well into the channel, past Cape de la Hogue, he thought of the ride from Ghent to Aix. The scouts were like those riders. Faraday dropped, but Maxwell went on. Maxwell dropped, but Hertz went on. Hertz dropped, but Crookes and Rayleigh and Thomson and Moseley went on. Now Crookes and Rayleigh and Moseley had dropped, but still the good horse Roland plunged ahead.

And Marvin Mahan was riding a mule to Sussex. He bore the unimportant news that Chase Mahan would pay a dollar forty an acre for something like half a million acres, which he intended to sell to Asher Ferry before the buyer knew who was behind the deal.

### Chapter 57. Lanthanum

Once on shore at Southampton he secured telephonic communication with the baron's secretary. He was informed that he could be received in about three hours, which would give his lordship's solicitors time to motor down from London.

The appointment being made, he searched out a bookshop and bought the volume which he had promised to buy. He became so interested that he read it all the way in the motor, letting the fields of Sussex go unobserved.

He closed it only when his car turned in to a fine old park where he caught a glimpse of fallow deer and remembered poor Sempronia. The house was much older than the title, and had a moat. He stepped from the car and told his driver to wait. He turned to mount the first flight up the terrace, and noted a fine figure of a man coming down.

"Why, Captain Mahan!"

"Why, Mr. Brinkerhoff!"

The British swell was only the Chicago lawyer. There was not a better lawyer or a more expensive one.

"Beautiful old place, captain."

"Wonderful, Mr. Brinkerhoff. I'm sorry I didn't come before."

The lawyer touched his small gray mustache and drew his hand across his smooth chin.

"The outside view is more pleasing, on the whole, than the inside."

"Mr. Brinkerhoff, I'm a chemist. I ought to be visiting a laboratory at Manchester this minute. I don't care to be known as a real estate agent."

Mr. Brinkerhoff smiled.

"I shall not mention seeing you, and the less you say about meeting me, the better I shall like it."

They shook hands on it, and each went his way, the one to report a failure, the other to seek out a hidden lord.

When ushered into a vast and shadowy library, Marvin was briefly greeted by the secretary, an unsmiling man of forty, who glanced at his credentials and handed his bulky papers to an older person, evidently a solicitor. Two others were in the room, but he was presented to none of them. They gathered around the document he had brought, a long and complicated deed of sale.

Marvin was conducted upstairs, with a word or two suggesting that he make no reference to the war.

His lordship, clad in a silken dressing-gown, was seated in a great easy-chair, with his feet on an ottoman, a Persian shawl over them. He was a very old man, clean shaven, pale and emaciated, but his close-clipped white hair was still vigorous. Near him sat his physician, who arose as the visitor entered.

Marvin was presented. The secretary placed a chair for him and withdrew.

"Your father," said Lord Fortinbras, "writes me that you know nothing about business."

"My father, your lordship, is often right."

The baron smiled and continued. "You may not be a financier, but I see from your glove that you know something about war. Sir Clifford here is curiously anxious that nobody should talk to me about the war."

Marvin was silent.

"Young man, don't you call it rather a joke that a man who has spent a lifetime to advance a navy should live to see his only grandson drowned when his favorite ship was sunk?"

"No, sir. I don't call it a joke."

The old man meditated. "He's like his father, Sir Clifford. Says what he thinks. Give him a drink."

The physician arose, but Marvin spoke.

"No need, Sir Clifford. I'm sufficiently excited by talking to his lordship. I've had a weak heart myself."

Sir Clifford sat down, and his lordship resumed.

"A weak heart, eh? Suppose you tell me more about yourself."

"Well, sir, I fall into water whenever I get a chance. My chief fear in approaching your lordship was that I might fall into your moat while you were looking out the window, and that you would drop dead from shock."

His lordship's thin abdomen shook with amusement.

"Were you ever drowned?"

"I've come within an ace of it twice this summer. Once an Indian got me out, and once the sweetest girl on earth got me out."

"I should like to hear about that girl."

Marvin recounted the adventure of the cave.

"Going to marry her?"

"Yes, sir. She says not, but she's mistaken."

"What's her objection?"

"I hate to confess it, but I don't know."

His lordship's sunken eyes grew thoughtful and reminiscent.

"The one who pulled me out wanted cowries. Did you ever read about my black girl?"

"Yes."

"How long ago?"

"About an hour."

Again the thin abdomen shook.

"Sir Clifford, the truth is in him. Couldn't I have a messmate or two down to meet him?"

Sir Clifford smiled and shook his head.

"Gad, you let those bores below see me, and ten minutes of them is worse for me than an hour of this rascal."

Again Sir Clifford smiled and shook his head.

"Mahan, this famous astrologer who is laying down the law to me is only a knight, but he takes his title like what an old don in my college once chanced to call a kinquering cong."

"Bully!" laughed Marvin.

"I like to hear you laugh, lad. You're a chemist, and I should like to hear you tell Sir Clifford that all his talk about controlling a heart by will power is the very sublimation of rot."

Marvin laughed again. "The will of God, sir, is sometimes pretty strong."

"Marvin, does your generation use that term—God?"

"Not often, sir, but when we need it, we need it rather tremendously."

The old sailor lifted his eyes as if, struggling in the water, he had caught sight of a green branch floating.

"Marvin, I have loved the sea. I'd give all I have if I could hope for one glimpse of blue water after this thing in my chest stops beating. But it won't be. I've faced it. It will be midnight in mid-ocean."

"My lord, such expressions as midnight don't mean much. The energy of radium is not visible, but oppose a bit of dust, and the night is filled with stars. It may also be filled with love divine, all love excelling."

"What form of affection is that?"

"The inscrutable form. It let your grandson drown and Henry Moseley perish at Suvla Bay. God, how I wish I had brains enough to continue that man's work!"

Lord Fortinbras looked at him steadily, and then changed the subject.

"How much does your father expect to make?"

"Two million dollars."

"What's he offering me?"

"Six hundred thousand."

"That isn't much."

"No, sir, but it's all he can raise."

"Lad, you mentioned young Moseley. I used to know his father. If I thought you had half of Harry Moseley's brains, I'd consider your father's offer. He's the sort of man to take his profits and build you a laboratory."

"I have no such dream, sir," said Marvin, flushing.

His lordship touched a button, and his secretary appeared.

"Nicholas, I'd rather like to speak to the physical laboratory at my college."

The secretary set to work, while the American shivered with apprehension, feeling certain that Professor Tonnesen knew less than nothing about him.

"Are you there, Tonnesen? Much the same, thank you.—Ever hear of an American named Mahan—not the sea dog, but a lad?—Weighed what?—I get it now, but it sounded like trope.—Those names mean nothing to me. Wait till I ask him.

"Tonnesen says you are younger than two chemists named Lewis and Langmuir."

"He's right enough. And those two men have made a tremendous contribution, but I'm guessing that on a certain point they are wrong."

Lord Fortinbras resumed the connection.

"He knows 'em, and he thinks they are tremendous but wrong.—No, he didn't go west. On the whole, should you think it a waste of money if his father built him a laboratory?—Thank you. Sorry to have interrupted your calculations."

His lordship put the instrument back on the table, and fixed his eyes on Marvin.

"Considering what Tonnesen has said to me, and considering that girl of yours, and considering the fact that I've had a million pounds from the

pine on that four hundred and thirty-eight thousand acres, I'm going to accept your father's offer."

"My lord, we are distinctly grateful, but your shares represent six thousand acres more than your estimate."

A door opened noiselessly, and the secretary laid a small sheet of paper before his employer.

"Thank you, Nicholas. Ask them to come up."

The shrewd sunken eyes scanned the paper until the lawyers appeared.

"Gentlemen, do you seriously demand a matter of sixty thousand pounds for six thousand acres of cut-over land?"

"There may be minerals in it."

"Quite so, but there are a dozen mines in the tract already. Give me the document and hand me a pen."

There was appreciable silence while that famous *Fortinbras* was firmly set down.

"If now you gentlemen will be good enough to witness it and seal it, I will hand it to the younger Mr. Mahan, and you can take the duplicate up to town. I'm sorry not to join you at luncheon, but Sir Clifford refuses to let me climb stairs, and allows me only—how much today?"

"Fortinbras, you have behaved so well that in a few minutes I shall let you have three ounces of clear soup, three of sole, seven of underdone roast, and a taste of salad."

"What, no wine!"

"You've been having wine for half an hour—in the form of conversation with youth. But as for

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the physical stuff, you've had no liquid with your luncheon for the past three months."

"Clifford, has a sea-dog got to live forever?"

"Well, then, six ounces of Hochheimer."

"Hock, the worst of German drinks! Nicholas, ask the nurse to double the portions for Captain Mahan, and send him up a bottle of port."

### Chapter 58. Cerium

The old man lay back and rested, closing his eyes. Sir Clifford rose and showed Marvin to his lordship's dressing room. When the guest emerged spruced up a bit, and was standing at the window surveying the dappled sward beneath the oaks, the physician joined him.

"I'll go to luncheon. If anything alarming occurs, touch the button at his right."

"Is anything alarming likely to occur?"

"I presume not, though we must expect a rupture very soon. Give him your arm to the dressing room, and permit no sudden exertion."

An hour later, when the sick-room luncheon was nearly over, the baron asked a question.

"Is your father intending to reforest?"

"He is intending to sell to Asher Ferry, who manufactures reapers, binders, drills, harrows, threshers, eveners, rakes, grain separators, and tractors, and therefore needs a good deal of wood. Mr. Ferry will of course reforest wherever the soil permits, and will probably mine the copper and the iron. Father surmises that he wishes to produce his own iron and carry it in his own steamers. That is why I have bought a coaling station for him, and have tried to buy him some silica so that he can make his own ferrosilicon."

"That's interesting. Why should your father belittle your business acumen?"

"I knew nothing of the plot until I reached Montreal. By the way, sir, I met Mr. Ferry's lawyer on your steps."

"Yes, Ferry has been at me for months. Offered six hundred thousand pounds, and I presume I should have accepted it next week. Told Nicholas to tell Brinkerhoff that if I had to do business with a pacifist I'd send for him in a day or two."

"It is not too late," said Marvin, flushing, "to cancel."

"Didn't mean that. If your father is willing to do business with Ferry, I'm quite satisfied. But you spoke as if your father were not in communication with him."

"That is correct. Mr. Ferry does not suspect who is behind the deal. If you ask me why father is willing to sell to him, I can only guess. I have learned that after we really went in, Ferry made tractors for the government at cost."

"It's a sufficient reason."

"But it changes your lordship's point of view."

The baron looked at him smilingly. "You're a refreshing novelty, Marvin. The contract is signed, and I'd sign it again. By the by, I once intended to colonize that land."

"That would have been a considerable undertaking. An Indian knocked me down before he would let me have ten acres, and the farmers are as independent as lords."

"Young man, your last expression is obsolete. But of course the project is impossible now. Those that I counted on to help me are gone. My wife is dead, my son is dead, and my grandson—my God! Why was it necessary to drown that boy?"

The fingers tightened round the stem of the wine-glass and snapped it. The hand sprawled over broken glass and flowing wine, and began to shake violently.

Marvin rose and grasped the wrist, and put his left arm around the quivering shoulders.

"Steady, grandfather. Be a good lord."

The suggestion had its effect. The patient gasped and gasped, but made a supreme effort to control his emotions. Gradually the pulse slowed up, the lips assumed a better tint, and he lay back quietly.

When able again to speak, he gave an invitation.

"Stay with me a week. May round the stake by that time."

"Thank you, sir, I'll do it."

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### Chapter 59. Praseodymium

As Ambrose Rich had found his son again in an Indian boy, so the baron seemed to have found again his own grandson. As twin elements of a rare earth are almost inseparable, so are beloved images in a fading mind.

Marvin found the days pleasant enough, there in the flickering shadows of oak leaves lightly stirred. Each morning he talked with his host. Each afternoon he rode the baron's favorite horse, or had a round of one-handed tennis with the secretary, or motored.

On the second morning Lord Fortinbras asked him another question.

"Is your father having any trouble with the remaining shares?"

"That I can't say. A Boston lawyer is handling the matter, but if the least breath of rumor starts, they may cost him as much as he has paid you for the voting majority."

"I see. Does he need a loan?"

"Thank you, sir, but he's maneuvering to make Mr. Ferry put up the money himself."

"What a man, what a man! Well, there should be one holding that will give him no trouble. The daughter-in-law of my friend Jimmy Hogg lives near Boston. Is there a place called Wickford?"

Marvin looked up in surprise.

"I have spent many a week-end at Wickford.

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In fact I roomed with your friend's grandson at college."

"Another link, my dear chap, between your youth and my eighty years. Jimmy married at two and twenty, and became one of my father's draftsmen. When my father returned from Canada and organized the original company, I persuaded him to give Jimmy some stock. It made him well-to-do in a few years, and he wished to retire. Think of it, a man of thirty-five with a son ten years old! We mocked him, and he emigrated as his Huguenot ancestor had done before him. His son grew up in Connecticut and married the Endicott girl. Since you know her, tell her that I say she should give you those hundred shares for a song."

"Lord Fortinbras, was there any ground for calling his ancestor a Huguenot?"

"Best in the world, lad. The name was La Hogue, which on English tongues becomes La Hogue. But after the French were defeated at La Hogue all the blackguards began to taunt the man, and he changed the name to plain Hogg. I used to tell Jimmy that he had no right to that name. If the grandson is a decent fellow, tell him it's poor navigation to sail under a British flag when the bottom is French. If you want this tale corroborated, have my man run you down to Beaulieu and see the vicar. He'll show you the records."

Accordingly Marvin motored into the New Forest that very afternoon. In the evening he seated himself at the secretary's typewriter and transcribed his notes. He posted the original to Kate Coggeshall and the carbon to his sister Anita, with instructions. Consequently two newspaper articles

appeared, one in the Wickford paper and one in the Ferry house-organ, and each gave Jimmy's ancestry away.

The end of the cheerful week came, and Marvin sailed for home. It was not till a month later, however, that Lord Fortinbras died. He had seemed to improve a little, and on the last morning was taking a turn on the terrace, supported by his secretary. To him his lordship meditatively remarked,

"Nicholas, do you know what that lad said to me when I was strangling? 'Be a good lord,' he said. I've tried to be. .I've tried to be. ."

and fell dead.

Chapter 60. Neodymium

About a week after Marvin's departure the mail brought the Riches four envelopes. One contained the deed for Keego, properly made out and ready for signing, another the wonderful check for four thousand dollars. This one contained also a polite note from Chase Mahan, apparently addressed to an aged spinster, trusting that he might have the pleasure of calling upon her within a month.

Having now a Kittiwake at her disposal, the Humming-Bird embarked to make a ceremony of the signing. Her retinue consisted of one editor of Tacitus, one Scotchman, one Red Leaf, one Black Hawk, one postmistress, one notary-gunsmith, and one dog.

Ojeeg and Shinguakonse were not at home, and Jean had to go after them. She found them in a little hayfield hidden among the cedars, working side by side, their long forks turning the masses of clover with ease. They saw her afar off, and stopped. There in the hidden hayfield the boy stood for a moment like his own tree, tall, and dark, and straight.

But he stood up no straighter than his father. In Ojeeg's face there was more than a reminiscence of ruined grandeur. Had not his great-grandfather stood side by side with the Black Hawk's ancestor, Waubojeeg, and driven the Sioux so far west that white men thought of them as plains Indians? It

was that last battle at the Falls of St. Croix which saved the eastern half of the United States. Nobody remembered these things now, but they were facts. And a poet named Longfellow had taken the stories given to Schoolcraft by the children of Waubojee, and made them into a poem called "Hiawatha," thus crediting an Iroquois with the divine feats of Manabozho!

But Ojeeg was content. The Bluebird had not died in vain. He had sent a new war cry, death to the boasts of the Bwan! And this time it would be a war in which all would gain. The common enemy was the evil little manidos which creep into human lungs.

The two Indians walked up to the birch-bark lodge, where now the family and the friends were assembled.

Shinguakonse made his father sit down on the red chest. Then from the ancient head-dress he brought an eagle feather and fashioned a quill into a pen. Ojeeg took it, dipped up a good deal of ink, and laboriously printed: **NICK FISHER.**

Then he drew a picture beneath—something meant for a fisher. It would have done just as well for a bobcat, but he bushed out the tail at the root and handed the deed to the notary. That personage, after holding it close to his thick lenses, added these words: "an American citizen of Chippewa County in the State of Michigan, and known in the Chippeway language as Ojeeg, the Fisher, chief of the ancient and honorable Crane totem, and further attested by his mark in the shape and image of the animal so called."

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Then the wife signed, adding a leaf. Dr. Rich and Jean signed as witnesses, the notary affixed his stamp, and the deed was done. Those graves were gone forever.

### Chapter 61

But of Indian graves who can say anything worth hearing? The undiscovered sixty-first element is known to be a rare-earth metal, but wisdom in dealing with backward races is rarer than the rarest earth.

Ojeeg belonged to the people that normally inhabit hills and live on venison or milk. Many a time this wild and living nitrogen has swept down from the hills and conquered the mild farmer who raises wheat and sesame—in short, starch. Thus fell starchy Babylon.

But starch in turn can conquer. It can backfire up the hills in the form of alcohol, first enchanting the primitive soul and then destroying it. When Ojeeg's ancestors first received their kegs of liquor, they straightway dreamed that earth is pure kindness and then slew their own families in the orgy of this romance.

Ojeeg was neither civilized nor savage. He was neither fish, flesh, fowl, nor good red Indian. But he knew his enemy, which is about the last thing that any man attains to know.

Chapter 62. Samarium

At supper, as Dr. Rich meditatively shook a few drops of canned milk into his tea, he remarked,

"We have seen a great sight this day. A hunter has become a farmer, and is less likely to starve."

"Hasn't there been a good deal of starvation in your day?"

"Yes, I have seen Persia lose a quarter of her population in one year. I have seen China lose eight millions in two years. I have seen Samara starved into cannibalism."

Jean did not pursue the subject. It was the subject she had thought about most and discussed with her father the least.

"Nevertheless," went on her father with unwonted vivacity, "much may still be done, for the age of farm colonies is just beginning. Japan understands this, and will find a way to feed her colonists, even if she has to fight America to do it. We ourselves should instantly care for a million farmers among our soldiers by reclaiming land."

"Daddy, it's a pity that I am the only one to hear you say such things."

The doctor smiled and changed the subject.

"We went off in such a hurry that I failed to open the rest of the mail. Suppose you do it."

Jean went to the library and returned with two letters, both bearing Connecticut postmarks. She opened one, and a check fell out. It was for three

hundred dollars and bore the marginal words "Traveling expenses." She read the letter aloud and clapped her hands.

"You will, won't you?"

He shook his head.

"Now, daddy, be a good child."

"My darling, this rustic dress, these long-established habits—"

"Yes, dearest, I know all about it. And I know all about that old brain of yours. Take it down to New Haven and save the soldiers. And on the train you shan't carry one bit of lunch. You'll just go into the dining car and order rare roast beef."

"One portion used to be enough for two."

"Fiddlesticks! I'll be right here to welcome you back. And when you do get back you'll be able to buy a new Sempronia."

"That's the only reason why I would consider it for a moment."

"My son, you ought to be ashamed of yourself. Fancy going a thousand miles and lecturing for a cow!"

"Well, child, I may prove weak enough to try it. But I won't stir a step without you to take care of me. Read the other one."

"It is from a place called Eglantine."

"Is Susan dead?"

"There's nothing in it about anybody named Susan. It is signed by some woman named Kate."

"Then the place has gone out of the family. Susan Endicott is the person who gave your mother her blue-edged china."

Jean was listening with one ear, but her eyes were snapping.

"After you have given two lectures at New Haven, you are going to a town called Wickford and talk to girls about Roman ladies! Goodness gracious peter me, and all I have that's fit to wear is a blouse."

"My child, there is no reason why you should not have a new dress. You have two double-eagles that came from Susan Endicott. You inherited one from your brother and one was sent to you as you lay in your cradle. Susan may be dead. But if she isn't, and if you will call on her in Wickford, I'll take you east."

"Of course I'll call on her. What is her married name?"

"Susan Endicott Hogg, a widow."

Chapter 63. Europium

The Wickford lecture was over, and Kate Coggeshall was shaking the lecturer's hand.

A girl turned to her neighbor. "Did you ever see such beautiful hair?"

"I wasn't thinking about it. I want to bring up two little Gracchi."

But after the bright bevy had clustered around him, an older woman approached. Her severe little bonnet was black above hair almost as snowy as his, and the girls made way for her.

"Do you remember me, Mr. Rich?"

"I've been glancing at you from time to time, Susan. I hope that my weak words have been blessed to you in your very becoming old age."

"Ambrose, Kate is going to bring you to dinner immediately. But where is Winifred's girl?"

Jean emerged from the bevy, dropped a curtsy, and rose still holding the edges of her organdie.

"Do you like it, Mrs. Hogg?"

"Very much, my dear."

"I wouldn't sell this dress for a million dollars, because your loving gift to my big brother is in it. I'm the only one left, Aunt Susan. Please try to like me."

Thus presently it came to pass that when Kate Coggeshall's surrey once more made its way up through the apple orchard, it bore Mainutung and Naynokahsee.

The dining room was just the same, all cool with the gleam of old silver, and rich with bichromate of potash rubbed into mahogany. The dinner began with due gravity, but presently Jean began to bubble.

"Oh, my aunt Susan, I love your fish chowder. This is the very first salt-water fish I ever did eat."

"Don't you ever make chowder?"

"Yes, whenever we have a big black bass."

"Do the Indians bring you the bass?"

"No, we catch 'em ourselves. The biggest one we had this summer was caught by our boarder, Mr. Mahan."

"Which Mr. Mahan?"

"Oh, his first name was Marvin. You don't know him."

"But we do!"

A telltale flush began to dawn on Jean's cheeks.

"Why, you see, Mr. Mahan came along and camped on my island this summer for five whole days."

"He has camped upstairs," smiled Mrs. Hogg, "for many a week-end. But we have seen little of him since James went to Chicago to work for Mr. Asher Ferry."

"Aunt Susan, I've seen Mr. Ferry's yacht and I've seen his daughter. She is awfully pretty."

"Yes, Gratia is beautiful."

"Oh, is that her name?"

Kate, wondering whether the lecturer's fee was balm for a wound inflicted or hope for future favors, changed the conversation.

"Mrs. Hogg, is what was printed in the local paper last evening true?"

"Why, yes. Miss Coggeshall is referring to an article that some impertinent correspondent has written about my husband's family. My son is not aware that that curious old cabinet over there was made by a Huguenot ancestor in Southampton."

After dinner the party retired to the porch, but not until Mrs. Hogg had gone to the old cabinet and taken thence a document and a tiny box.

"Jean, when I heard you were coming to Wickford today, I sent to the bank and bought another gold piece."

"Why, thank you very much, aunt Susan. Here's a kiss for you, right on your pink cheek."

"And now, Jean, if you don't mind, I am going to ask your father some questions about business."

Ambrose Rich chuckled. "No, Susan. Something's happened to you."

"Miss Kate," cried Jean, "they're going to fight. Let's you and me run away. Come and wander with me in the gloaming."

"Miss Jean," said the educator with dignity, "I have not only wandered with youth in the gloaming, but my whole bulk has been lifted off my feet, and I was kissed in mid-air."

"Well, I can't do that, but I have lifted a whole man into a boat."

When they were out of sight, Mrs. Hogg began to talk.

"I want to ask you about these shares of the Upper Peninsula Development Company. It is an old one, formed in the time of the Civil war. It made a good deal of money for my father-in-law, but I wish to know whether it is worth anything now. Here is a map that came with it long ago."

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Ambrose Rich took the map and studied it in the light that came through the window.

"I can't answer your question, but there are both iron and copper in that region. Who holds the controlling interest?"

"Lord Fortinbras, the famous yachtsman. He is very old now, and I think his son is dead. Whether there are grandchildren I don't know, but they say that a Fortinbras never sells anything."

"Well, I advise you to keep it for James. Pray tell me something about him."

That was invitation enough for Susan, and she proceeded to recount her son's successes at some length, until after fifteen minutes she heard Kate Coggeshall's voice calling from the darkness.

"Mrs. Hogg, please excuse yourself and come down here."

Mrs. Hogg carefully descended the steps and proceeded toward the gate. There she found the experienced dean of girls standing with her arm around Jean.

"What do you think?"

"I can't imagine."

"Do you recall a certain auburn-haired youth who made me scream?"

"I do."

"He's proposed to this child."

Susan Endicott Hogg was glad that her face could not be seen in the darkness. This was the best news she had heard in many a day.

"I'm very glad for you, Jean."

"But I haven't accepted him, and I never will."

"Of course you will! And when you're married, I'll give you your trousseau. Meantime, just to

show how grateful I am for coming to see me, I want you to take this thing."

She pressed into the hands of the surprised girl the certificate of stock, which was not too old to crackle in the dark.

"What is it?"

"Just some worthless stock, but it will not always be worthless. I'll transfer it for you. Perhaps when there is another Jean, it will buy her trousseau."

### Chapter 64. Gadolinium

When the Riches were nearing home on the afternoon mail tug, they found the river covered with dense smoke. There was evidently a forest fire not far away in the west, but as their own peninsula had not been touched by fire in seventy years, they gave it little thought.

Having brought an overjoyed Agricola from the post-office, they crept down the river in the dory. Not a steamer was moving. At their pier lay a launch containing an open satchel and some articles of dress, as if some man had hurriedly changed his clothes. Surprised at this, they hastened to the house to see who had come, but found everything locked and shipshape.

Agricola was off, and presently they heard his familiar bark, followed by a moo.

"He is chasing Mr. Gillies' cow home," said Jean, and went on opening windows.

But the barking and mooing continued, and they walked up to the barn. There stood Agricola in the open door informing a cow that she was a beauty. Something brought tears to Jean's eyes as she read aloud the card attached to the cow's horn: "My name is Sempronia the Second, and if you want to know who bought me, look on the wall."

Turning, Jean perceived a sheet of foolscap tacked to the logs. On it were the names of thirty persons. Then the smoke seemed to affect the

doctor's eyes, too, and he stood in silence, holding Jean by one hand and petting Sempronia with the other.

But while they stood there Agricola deserted them and was exploring his old domain. As father and daughter were walking back to the house they heard him again, this time with a different cadence, and they mounted the hill.

Deer after deer sprang up. Refugee rabbits scurried in every direction. Butterflies swarmed by the thousands. The smoke grew thicker and thicker, and a little sound of crackling could be heard. They quickened their steps, descended past the garden, and penetrated the balsams. The air grew hotter and hotter.

They came to their fire-ditch and stood in amazement. Between the ditch and the creek the land lay bare in both directions. Only a few black trunks, blazing near the tops, remained of eight acres of woodland.

"Weel, doctor, it's not so bad, conseedering."

They turned to the left. There beside the fire-ditch lay the Scotchman, his eyes bloodshot, his spray of yellow beard partly gone, his overalls burned and torn, his shoes covered with clay and ashes.

"Thank God you were here, my friend. What with giving me new live-stock and saving my house, you have put me in debt for the rest of my life. How could you do it, single-handed?"

"Na, not single-handed. Look about ye Ye'll find them lying all along the trench. But yon's the mon that really did it."

Gillies pointed to an abject figure that sat with its grizzled head almost on its knees.

The doctor approached the silent figure.

"My dear sir, whoever you are, the English language tails me."

"Say it in Greek. My boy says it flows like wine in your house."

"Why, daddy, his poor back is almost burned to a crisp. Give me your knife. You needn't be afraid, sir—my father's knife is always sharp."

The flesh quivered as Jean deftly cut away the back of the shirt, but the voice was silent. Then with a swift movement she removed the front, leaving the torso bare to the waist.

"You are as brave as a lion, sir, and I know who you are."

"Do you? Then I know who you are. You are the elderly spinster who wrote me that her age was twenty-one. I came up here to complete a transaction. I want your island."

"You may have it."

"For how much?"

"For nothing. I'll pick up that island and put it in your arms."

On the way over he told her about the fight, which had lasted several hours. Some hunter had taken advantage of the doctor's absence to get a deer out of season, and had accidentally set fire to the woods in the process.

She seated the injured man on the porch and went into the house for things she needed. It took her some time because she had to make a fire. When she came out, he was still sitting with his eyes closed.

"Your Duckling must be a charming thing to look at when the smoke does not hide it."

"Yes."

"There's a lump in your throat, little Miss Rich. Do you love that island for its beauty?"

"Yes."

"Then you must not part with it."

He felt a soft warm sponge begin to smooth his arm. He felt it go into his armpit. It stole over his chest, down to his waist, around to the other arm. A soft towel followed, till his whole front was dry and clean. Then she began on his back, very softly.

"Are you using a solution?"

"Yes. Horatio must have known you were coming, for he left us a little picric acid."

"It feels good."

On learning that he would not be able to wear a coat again in several days, Chase Mahan declared that it would ease his pain if he had something to do. If it rained, he'd like to clean up the burned tract. Might he count on the fire-fighters to return for two or three days and bring their axes?

That night the home-comers slept to the welcome sound of rain on the roof, but Chase Mahan sat up till nearly dawn, forgetting his wounds in the Tacitus which he had himself discovered.

The next day went as planned. Down came the charred stubs, and were heaped and burned. On the second day the farmers came again with teams and scrapers, and the morning of the third day dawned on a beautiful smooth plaisance.

### Chapter 65. Terbium

As he paced the deck on the return voyage, Marvin came again to the conclusion that he had been refused because Jean was unwilling to leave her father. She was unwilling even to discuss the matter, lest she give way. Dr. Rich was too old and too deeply attached to his northern retreat to be transplanted to a city.

Well, nothing could please Jean's lover more than to settle down there with her in the woods, provided he could find something to do to make a living. Were he in better favor with Asher Ferry, he might perhaps hope to be employed in connection with that vast tract of Michigan land. Asher would certainly need chemists in his new northern domain, and a car might make it possible for one of them to live at some distance from the tract.

But Asher was out of the question. What then? Might not a chemist put up a diminutive laboratory and manufacture something at Upper Encampment? Chemists had been reduced ere this to making tooth-paste or pills. Marvin grimly fancied himself naming a tooth-paste for Ojeeg or the Red Leaf.

Of course there was one other wild suggestion, the suggestion of Lord Fortinbras that Chase Mahan might take his two millions of profit, when he got it, and endow a research laboratory. The notion would never have entered the old baron's head but for a guilty conscience. Without lifting

a hand he had made a million pounds from the sale of virgin American pine. But Chase Mahan would not be warranted in entrusting a research laboratory to a son who was but a tyro in physics.

He had come away from England without making any effort to visit Oxford or Cambridge or Manchester. He leaned over the rail and saw those bits of Eden looking up at him from within the dark crystal. There was the Cavendish laboratory at Cambridge, with Sir Joseph Thomson running his fingers through his ambrosial locks as he evoked hypothesis after hypothesis to be tested by his pupils. Sir Joseph had been the Mecca of the world's physicists for many a year.

And there at Manchester was Thomson's most famous pupil, Sir Ernest Rutherford, the man under whom Boltwood and Bohr and Moseley had studied. What was Sir Ernest doing now? Was he continuing Moseley's work, or was he trying to prove that every atom is built up out of lighter atoms?

Many able chemists denied that it would ever be possible to change one element into another and so release the incredible heat. Though admitting that Rutherford was right in regarding every nucleus as made of positive electricity, they declared that no human skill could pierce that nucleus. But it would be like Rutherford to try. If he did so, it would be by bombarding light substances with radium, in the hope that some helium atom might hit a nucleus and split it.

But these speculations all faded back into the wave as the steamer approached New York.

On landing he called up the laboratory to make

sure that Grein was taking the much-needed vacation. He was informed that Dr. Grein was in town and at his work as usual. So uptown went Marvin and burst in upon his friend.

Grein was seated at a desk, figuring. He glanced up.

"Well?"

"I'm glad to see you looking better."

"But what do you say?"

"About what?"

"Didn't you get my letter?"

"No. I've been in England."

"Did he show you?"

"Did who show me what?"

Grein scowled, scribbled an equation, and pushed it across.

Marvin looked at it and remarked, "I'd call that a helium nucleus pushing a hydrogen atom ahead of it about forty thousand times faster than the bullet that killed Moseley."

"Don't you *know* what Rutherford has done since we last met?"

"No."

"He has disintegrated the nitrogen atom. He has knocked hydrogen atoms out of the nitrogen nucleus."

Marvin said nothing—merely clapped his hand to his stomach as if a thunderbolt had hit him there.

"I see it gets you," smiled Grein. "Better get back into the game."

"Are you offering me a job?"

"The president thinks I'm offering you the earth. But it's only an assistant professorship."

"Grein, you're an angel of mercy. But I can't

give you an answer till I know whether I'm to be married."

"Haven't you got that matter fixed up yet?"

"Not exactly."

"Well, in God's name get it settled, and bring her down here and get to work. We have just given Langmuir the Nichols medal for reactions at low pressures, but his criticisms of Rutherford and Bohr drive me to drink. They fascinate me, and I can't disprove them, but his atom is too simple."

Marvin sat immobile, still thinking of the marvel accomplished by Rutherford, and Grein went on.

"The stuff you sent me from France may contain the solution, especially what you have to say about interpenetrating elliptical orbits. But think of the years of experimentation before us."

"I'm anxious enough to work under you, Grein."

"Marvin, I'd be equally glad to work under you. Sometimes in a moment of madness I dream of a quiet laboratory—no students except a few picked men—no limit to cost of apparatus—no newspaper reporters—"

"Fairy tales don't come true."

"That's correct, but I shall be happy enough if you join me within a month."

### Chapter 66. Dysprosium

Marvin tripped to the station and took the two o'clock train. He was almost as excited as if he were an alchemist beholding the actual projection of gold. Release two charges of positive electricity from 82 and get 80, one negative from 80 and get 81, two positive from 81 and get 79, which is gold. When that process is effected, the energy released will turn all the wheels of earth with effortless ease, and the gold can be thrown away.

By five o'clock the next afternoon he had calmed down a little, though when he burst in on his mother she hardly knew him, so strong and bronzed and radiant did he seem.

She explained that his father was at Upper Encampment recovering from a burn and that Marvin's presence was required there by the first boat. She handed him Grein's letter, and they read it together, as in his childhood they had read of Aladdin and the lamp. Then she telephoned his father's office to have the accumulated business mail sent at once to the boat.

When she came back to him from the telephone, he drew the silvery head close to his heart and told her the whole truth about Gratia and about Jean.

They would have talked on for an hour, but she hurried him into the car and off to the boat. There he found that he still had a little time, and decided

to improve it by calling up Jimmy.

In this however he failed. Jimmy's landlady, in answer to the request that he might speak with Mr. Hogg, declared that he was hard to speak with; that he was upstairs writing a speech.

Jimmy writing a speech? Impossible! James Endicott Hogg had never in his life been known to make a speech.

### Chapter 67. Holmium

Next evening Marvin lounged along the shore of Mackinac, remembering the Bright River's immortals, and another morning found him on another steamer.

An hour later he was standing on the starboard side, searching the horizon for the limestone ruin where he had shivered all night.

He turned with a sigh, and bumped into another passenger.

"I beg your pardon."

"I beg yours, captain."

Marvin flushed. There was no mistaking the lean figure, the myopic eyes, the thin but masterful face.

"Mr. Ferry, I'm ashamed that I once demanded your services as butler. I did not know that you had been doing all you could to win the war."

"Captain, you took your disappointment like a man."

"May I ask how Gratia is?"

"Very well and happy. She is engaged to be married to Mr. James Hogg."

"I congratulate Jimmy, and, if I may, I congratulate you."

"You may. I think I'm going to get a pretty able son-in-law. It may interest you to know that she accepted him as Hogg, but that ain't his real name. It seems he's a Huguenot. I don't know

much about the Huguenots, but I know they were good workmen."

"Mr. Ferry, I called up Jimmy's boarding-house day before yesterday, and was told that he was busy writing a speech. Can you throw any light on that?"

"Yes," laughed Asher. "I've made him a departmental manager, and his men gave him a dinner night before last. I was invited, but couldn't attend. The committee that came to see me showed me a petition they were presenting him—a request to change his name to La Hogue. So I guess he was writing a speech of acceptance. Now tell me what we are going to do when that stuff"—here Asher pointed to the coal on the dock they were passing—"is all gone."

"Why," said Marvin, "I suppose you'll use hydro-electric."

Asher turned and scrutinized his companion with myopic luminous eyes.

"Young man, that answer ain't enough. You are capable of a better answer than that. If every drop of water that falls in the United States was utilized to produce power, it would produce no more than we are getting from coal right now."

"What makes you think I've given any attention to the matter?"

"I'll be frank with you. After you called at my house I took steps to find out exactly how much of a man I had to deal with. I know your college record, your war record, and your chemical record."

"Perhaps you do," smiled Marvin, "but you don't know what I was reckoning when I woke up

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after losing my hand. I was calculating how much alcohol could be extracted from a ton of straw."

"Well, how much was it?"

"Not enough. It would take the whole corn crop of the United States to duplicate the heating power we are now taking from five billion gallons of gasoline."

Asher nodded. "I reckon there ain't two other men in the country that's worrying. Maybe I'm wrong—there may be others—but you're the first one I've met."

"My father, sir, thinks that you see a long way ahead."

"Does he? He has a funny way of showing it."

"I'd like you to meet him, Mr. Ferry."

"I don't want to meet him."

"But he is only a few miles away from us at this minute. I want you to stop off with me and get acquainted with him."

"I won't do that."

"Mr. Ferry, I'm guessing that you will. He has the mistaken notion that you are a coward. What's the sense in letting that notion continue when you might dispel it in five minutes? You are the master of thirty thousand workmen who have never been able to form a union, and yet you hesitate to face a man who has much the same ideals as yours."

"Marvin, let's drop that subject. Come up here in the bow of the boat, out of the wind, and talk to me about solar energy."

They walked up the deck and seated themselves near the lookout.

"Now, this here process by which a leaf extracts the energy out of the sun. Can't that be duplicated in a laboratory?"

"Possibly, some day, but it amounts to discovering the secret of life. To get even within speaking distance of that problem there would have to be long co-operation between botany and physiology and organic chemistry and radiochemistry. If you gave every cent of your wealth to a university to advance such co-operation, you would still be taking the longest way round."

"I'll never do anything for a university. They ain't practical."

"Mr. Ferry, that remark is the remark of a great man who on most subjects is an ignoramus."

"Trying to insult me?"

"You know I'm not. I can't look at you without liking you. I think you must give your employees some sort of doped drink to make them like you."

"Marvin, you've got the courage of your convictions, but you don't know much about the real world. I tell you colleges ain't practical."

"And I tell you, Mr. Ferry, that a research laboratory does the best work when it's right in the heart of a university."

"Well, we're getting off the track a little bit. The chemist who looked up your chemical record for me said you'd been wasting your time on lead."

"He's welcome to his opinion."

"What interests you in lead?"

"A good many things. One of them is the weight."

"Ain't that known?"

"Lead is averaged at 207.2, but it ranges as low as 206."

"What makes it vary?"

"Different patterns in the nucleus of the atom. But radium steps down into lead evenly---226, 222, 218, 214, 210, 206, which means that it loses four points of mass at each step."

"What makes it do that?"

"Because it releases two charges of positive electricity at each step."

"You mean to tell me that lead is full of electricity?"

"I do. It is solid electricity, kept from explosion by the tension of its opposing charges."

"Can you prove it?"

"Ask any physicist."

Asher studied the deck. "You mean to tell me that the lead in the paint on this floor conceals power?"

"I do. And some day that power is going to be used in cylinders. Sooner or later we are going to make lead behave as radium does now. We are mining a million tons of it a year, and virtually wasting it. Your chemists may laugh as much as they please. I don't expect any man but a man like yourself to entertain the idea."

"Marvin, I want to get this thing straight in my mind. Do I understand that the chemical elements can be lined up, one, two, three, four, five---like that---according to the amount of power in them?"

"That is correct."

"Then I'd be guessing that the even numbers are the commonest elements."

"How do you get that?"

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“I don’t know. Things come to me like that sometimes.”

“Well, I’d like to say that you are probably right, and that you never said a keener thing in your life. That is precisely the sort of right guess that gave us dynamos.”

They looked at each other and glowed with friendship.

“Marvin, don’t I owe you something?”

“Nothing except to stop off and meet my father.”

“Then I’ll do that, because I want to hear you talk more. But I don’t want you to think me a stingy man just because I have no use for colleges. You’ve lost a hand in the service of your country, and your country ain’t going to pay you for it. Your country ought to give you a chance to study lead, if you like that sort of thing. You lost a hand, and you lost a girl. I’m the father of that girl, and I appreciate the way you took it. I’d like to show you that I like you for giving up Gratia.”

“It cost me nothing, Mr Ferry. We both considered ourselves lucky to have found out in time. Didn’t she tell you?”

“No,” smiled Asher. “I guess she liked the decoration—I mean your scalp hung at her belt. Girls are queer.”

### Chapter 68. Erbium

They left the steamer at Encampment, but were delayed there for a long time, being unable to hire a skiff. About five o'clock however the Black Hawk returned from Canada in his own canoe, and lent it to them. Asher Ferry carefully paddled it four miles northward to the Duckling.

Marvin pointed out the tent, landed his guest below it, and excused himself. He meant to run up to the house and take the force of Chase Mahan's wrath before it did any harm.

He failed to find his father, but he did find his girl. She was in the kitchen preparing supper, and was so surprised to see him that she barely escaped kissing him.

Left alone on an uninhabited island, Asher Ferry felt pleasantly wild and free. He had come in an Indian canoe, was going to sleep on the ground like an Indian, and was going to discuss the most interesting of all problems with an authority. So he ran up the path like a boy and stood looking into the cozy tent.

But there was some one already in it! On the blankets lay a man with smooth face and grizzled hair, reading. The man glanced up and gave a start.

"You can't come in here!"

"Is it your tent?"

"No."

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"But might makes right. You're a Prussian."

Ferry turned and walked down to the canoe. But after he had seated himself and begun to paddle, somehow she wouldn't start. He turned around and saw that his swift and silent enemy was holding the stern.

"I was wrong, Ferry. Come ashore."

Ferry climbed out again, and went up to the tent, where he took possession.

His enemy now came and stood in the doorway himself.

"Do you admit you are yellow?"

"No."

"You told young Hogg to be a slacker."

"You're a liar. I told him that Wall Street would have him put on the firing-line and kept there."

"What has Wall Street to do with it?"

"Wall Street hates me. So do you."

"You're a liar. I never hated you. Since I found out that you really did what you could to win the war, I've been waiting to call you Asher and call you my friend."

"Chase, if I was a profane man, I'd say I'd be damned. Come and sit down on these blankets. You are a big bully, but I can't help liking you. Always did like you."

"Asher, what in the name of time brings you here?"

"Your boy brought me. He's all right. He knows a thing or two that my chief chemist ain't onto yet."

"Asher, it warms the cockles of my heart to hear you praise that cub."

"Chase, this is great. If I tell you a little secret, I know you'll keep your mouth shut. I'm on my way to look over a big piece of land. They said I could never get control of that land, and they'll call me a land-hog when I do get it. But I'm likely to get it pretty soon now, for about three millions. I'd pay four rather than lose it."

"You won't have to."

"How do you know? These lawyers get rich off me."

"Mine won't. I'm going to get rich off you myself."

"Are you behind this deal?"

"I am. Your Mr. Brinkerhoff failed, but my boy didn't. I have nearly all the rest of the stock. When I get a hundred more, I'll trouble you for three millions."

Silence.

"Don't think I'm out to bleed you, Asher. In ten years you'll make that land worth ten millions, and I have a couple of little presents to help you do it. You'll be wanting explosives, and I'm going to hand you fifty thousand pounds of the best. You'll be wanting a coaling station, and I've got one for you. You may be wanting rock for your electric furnaces, and I was going to give you this island, but I can't get it."

A moccasined step at the door of the tent.

"Supper is ready."

"Miss Rich, this is Mr. Asher Ferry."

"Mr. Ferry, I'm glad to see you. But I heard what Mr. Mahan said to you just now about this island. That was a whopper."

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"Asher, you can't have it. She refused ten thousand for it."

"Well, Chase, I'm glad there's somebody you can't twist round your finger."

### Chapter 69. Thulium

The last few hours had been full of surprises to Asher Ferry, but he had adjusted himself to them with the promptness that made him what he was, a great manufacturer.

At supper he was destined to new surprise. He discovered Ambrose Rich, a professor who seemed to understand farming. It was a much greater shock to Asher than the discovery of a friend in Chase Mahan. He was curious to press the matter farther, and see on how large a scale the old fellow could conceive of handling earth.

"I want to wash the dishes," said Asher.

"I want to wipe them," said Ambrose.

"I want to put them away," said Chase.

"I'd like to see you do it," said Jean.

She sat down on the woodbox, and Marvin joined her.

The manufacturer did the silver and glasses in silence. Then he carefully picked up a piece of Worcester Royal.

"Professor, if you had a tract of land 'most as big as Rhode Island, what would you do?"

"I'd imitate Prospero."

"Who was he?"

"An Italian duke with an only daughter. He commanded the air and the lightning, but he loved his daughter so much that he resigned his power."

"Professor, I never heard of him."

The doctor handed the piece of china to Chase Mahan, who put it on the shelf and joined the conversation.

"Thank you for telling Asher that tale. When we get these dishes done, I'm going to take him out on the porch and remind him that Prospero let his daughter marry the son of his bitterest enemy."

"Chase, you don't have to take me out on the porch for any such purpose. If my daughter wants to marry your son, I shan't say a word against it."

"Thank you, Asher. I knew you'd recognize some obligation, but I don't wish to be too personal before the young man."

"Is he blushing?"

"He seems to be."

"Well, Chase, you can't most always sometimes tell what a boy is blushing about. Now, professor, Chase thinks he's going to sell me a piece of land. It ain't as big as Iceland, but it's fair to middling big all the same. What shall I do with it?"

"Cut it up into farms, some small and some large, but about equal in value. Give the buyers a thirty-year amortization mortgage."

"Professor, there ain't much of it good for farming."

"Then map it out for towns, and reforest. Don't establish a single logging camp but what you can make it into a town. Run your railroads into the woods from your permanent centers, and bring your lumberjacks home every night."

"Professor, I like you. Keep right on."

"Well, Mr. Ferry, plan your villages carefully, but don't insist that your villagers shall spend their money to please you. Let them build their own

houses. Don't tell them how much they are to spend on amusements, but see to it that good ones come their way."

"All right, what else?"

"Don't freight your iron down this river, but use it where it's found. Do the same with copper."

"I will. Chase can give that coaling station back to the seller. Anything else?"

"No."

"Chase, how soon can you get the rest of the stock?"

"I don't quite know. But since the dishes seem to be done, let's go into the library and find out."

He led the way, and examined the mail that Marvin had brought. One by one he tossed the letters aside till he reached a Boston postmark. Then he learned what he sought, and smiled with surprise.

"Asher, I don't know whether I'll get that hundred shares or not. I'll give a hundred thousand for them, but this young lady owns them."

He handed Jean the letter, and her forgetmenot eyes opened wide with astonishment. Then she went and brought that crackling old thing which Susan Endicott Hogg had endorsed for her.

She gave him the document, stood on her tiptoes, and kissed him on the chin.

He smiled down at her.

"My dear, I can't accept it for nothing."

"But I can't take pay for it. Stock means dividends for people that don't work."

Having let off this bit of dynamite, she escaped by the front door. Instantly both father and son

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started for the door, but Chase was the quicker and stood blocking it.

"It's my right, dad. I love her."

Chase only blocked the door more effectively.

"You young scamp, here I've been turning half the stones on earth to get you married to Asher Ferry's daughter. Do you think I'm going to have you out after dark seeking a fortune?"

Marvin backed away, and his father disappeared into the night.

### Chapter 70. Ytterbiam

The engineer found his prospect down by the river, perched on a great rock which in the night looked as black as the black mica of Ytterby.

"I have come to return this certificate."

"But I gave it to you."

"So you did, and nothing could have been sweeter than the manner of it, but your conscience was not satisfied. It seems to me that it ought to be satisfied, for Asher Ferry intends to do with that land exactly what your father advised. All you need worry about is my profits."

"Can't you get rich without my consent?"

"I cannot. For once the laws of a land company were drawn by a man who respected the rights of the minority."

"If you will come up here and lend me a pen, I can write on this stone."

And so by starlight the document was signed.

"Now what shall we do with the profits?"

"I don't know. What do rich people do with money?"

"They usually provide for their sons' wives. How soon are you going to marry Marvin?"

Jean took one last desperate look at her stars, and found enough courage to answer,

"Never."

"I am sorry to hear that, and my wife will be sorry, too. Don't you care for him?"

"I'd rather not answer that question."

"Won't you let me send him down here to plead his cause?"

"No. I don't want to see him again, and in two or three years he will forget all about me."

"Two, or three?"

"Three. Ask him to come back in August, 1922, and bring his bride."

"Very well. One thing more. Have you any objection to my seeding the land over by the creek and putting a few sheep in there?"

"That will be lovely, Mr. Mahan."

### Chapter 71. Lutecium

Chase left her there in the starlight and returned to the house, holding up the document that clinched the sale.

"I've got it, but she declares that she will never marry my son. She requests him not to return to this place before August, 1922, when she will be glad to see him and his bride."

There was a moment's silence, and then Dr. Rich spoke.

"I'm sorry to hear this news. She has burned her bridges, and I'm afraid she'll regret it, as the island now called Paris regretted burning its bridges against Julius Caesar."

Marvin looked steadily at the doctor, and came to a decision.

"She can't be blamed, sir, but I'm off tonight for New York."

He drew Grein's letter from his pocket and handed it to his father, who read it with exclamations of pleasure.

"Boy, I've been expecting something like this. Dr. Rich, I'd like you to see what a good judge thinks of this lad."

Dr. Rich read, and shook Marvin by the hand.

"My dear professor, I am glad that one institution does not demand a German doctorate before it recognizes ability. But I can't make head or tail of what this chemist writes. Mr. Ferry, this heathen language is more in your line."

Asher Ferry put on his eye-glasses and studied the letter.

"Well, I get some of it. Marvin is to do no teaching, but is expected to help with administration. Most of his time he will spend in a laboratory. Young man, are you coming back here in August, 1922?"

"Certainly."

"Well, there's going to be trouble about coal before that time. Send me your articles on coal."

"I shall hardly be writing on that subject."

"Then send me whatever you do write. Just put your name on the wrapper, so's my secretary won't think it's from a crank."

"Thank you."

"Marvin, I notice that when we get an invitation and my wife just says thank you, we ain't a-going."

A faint smile appeared on Marvin's lips.

"Young man," said Asher Ferry sharply, "if my chemists can't follow you, I'll hire one that can. You and I had a pretty good talk on the boat, and you didn't seem to think me such a damn fool then. I know you ain't much interested in coal. What you want is to turn some substance into some other substance—change the atoms—and make use of the energy. But there's one thing I'd like to know before we part. Why has most of the elements got fractional weights?"

"Because they are mixtures."

"I don't understand that."

"Well, weight depends on the nucleus of an atom, and we don't know much about the pattern of the nucleus yet. But take any atom, and all you need to keep it the same atom is the same balance be-

tween nucleus and moons. A nucleus having six positive charges bound by three negative will give lithium just as surely as seven positive bound by four negative. Ordinary lithium is a mixture of a lighter lithium and a heavier lithium."

"Then what's called pure elements ain't really pure?"

"Probably not. I could tell you more about it if I knew what a chap named Aston has been doing recently in England."

"Well, before you can change one element into another, you've got to get it pure, ain't you?"

"Exactly."

"I see. You reckon you'll spend a few years on fractions?"

"I may spend my whole life on them."

"That's the right spirit, Marvin. Now, whenever you get rid of a fraction, I wish you'd drop me a note. Will you?"

"I will."

"Good for you. And now I think I'll go to bed, if your father will keep me company on the island."

A few minutes later Marvin stopped by the Tarpeian on his way to his canoe.

"Darling, I'm off. I don't blame you for being unwilling to leave your father. May I write to you every day for the next three years?"

"I'd rather you wouldn't. Please don't write except to say that you have found somebody else."

"Then it will be three years of solid silence. But I'll be back before your birthday in August, 1922."

## Chapter 72. Hafnium

The last thing that young Moseley did before enlisting was to puzzle his wits over the missing seventy-second element. Not until January of 1923 did chemists following his method decide that the new element is like zirconium and name it for the harbor of Copenhagen.

Meantime two men were trying in vain to sleep beside the less famous harbor of Jean's Duckling.

"Move over, Asher! How am I to keep my legs under the blanket when you take up more than your share?"

"Chase, you got your full share of my money this evening, and now you want the whole blanket."

"Suppose I do. It's no more than your competitors will want after you are gone. Young Hogg won't be able to keep your pace. They'll get most of it away from him. You'd better salt some of it down in that little college to the west of you where Dr. Rich used to teach."

"Chase, I told them long ago that I'd never do anything for Warrenville or any other college."

"Asher, what an old fossil you are. You're worse than Charlie Yerkes, who wouldn't do a thing for education till Harper had appealed to his childish sense of bigness. Charlie was willing to build the biggest telescope in the world just because it was the biggest."

"He showed good sense, Chase. When we were canoeing up here, your boy made it clear to me that

the stars are the perfection of power. The sun is a star, and coal and oil are starlight. You can call me a fossil if you want to, but I've got mind enough to see that much."

"Asher, you have a very remarkable mind, and it is vision that has made you great. But whether vision entitles you to money I don't know. Lincoln and Pasteur didn't make much money out of their visions."

"Well, Chase, you've said some hard things about me, but I don't mind what you are saying now."

Asher turned once or twice, somewhat in the manner of a dog seeking a better form in the grass, and then sat up for good.

"I don't seem able to sleep in this queer place. I think I'll ge' up and take a look at Charlie Yerkes' stars."

So up he got, and dressed, and went out into the night. Ten minutes passed. Through the door of the tent Chase could see him standing immobile. Then Chase wrapped a blanket around himself and emerged from the tent.

"Asher, do I intrude?"

"No, I hoped you'd come. You know their names, and I don't."

Chase glanced up. "The names don't amount to much. That one up there that they call Arcturus is eleven hundred billion miles away. You can't buy it, and it doesn't care how rich you are. But almost all the stars in Orion are helium stars, and Marvin has the notion that some day we shall loose the bands of Orion within the stuff called lead. That will be a bigger achievement, a million times over, than anything Charlie Yerkes ever imagined.

I wonder whose name will be associated with that supreme triumph?"

Asher was silent.

"My friend, you stand here under the stars and have no notion of how fast the starlight in your gas-engines is failing."

Asher remained inarticulate.

"My friend, your family line will stretch out to the crack of doom, and I see them reduced to beggary."

Asher only smiled at him in the starlight.

"My friend, you are as credulous as a schoolboy. You believed that nonsense about Wall Street, and you believe that you are going to live as long as the Christian era."

At this point Asher spoke. "Of course I'm not going to live as long as the Christian era. That's why I want the Christian names of those things up there."

"They haven't any."

"Ain't that an oversight?"

"Well, Asher, I suppose the Christian astronomers were afraid you'd copyright the names. Are you hunting for a trademark?"

"Not exactly. I want a name for the laboratory that you and I may be going to build right here."

The stars kept still while astonishment ran through Chase and exploded in laughter.

"My wife wins! She told me I was no match for you. Asher, the land over by the creek is a better location. It's farther away from the newspapers. I will put in two millions, and you will put in one."

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"Not too fast, Chase. All you are going to do just now is to buy a thousand acres surrounding the professor's farm. You can pay for it yourself."

"I'll do it. What are you going to do?"

"I'm going to watch those fractions for three years. I don't doubt the boy's executive ability, but I want to make sure about his ability to direct research. If you ever get a telegram from me about research, you'll know I'm ready to go fifty-fifty."

### Chapter 73. Tantalum

The departure of the rich left the Riches as poor as ever, but as a result of the eastern trip the sale of the text-books increased a little, and furthermore the doctor earned a hundred dollars by writing out his Roman ladies. This was Kate Coggeshall's doing. She asked him for the article, sold it for him, and sent him the check. He turned it over to his daughter for her own use.

Jean used it. Being determined not to break her heart over a chemist, she decided to study chemistry. Ojeeg was only too glad, now that the Little Pine had departed for school, to buy the lumber for her and begin to build her a little laboratory over in the clearing. The boys on the patrol boat discovered what he was doing, and lent him a hand to raise the frame.

Meantime Marvin resumed his work. If like Tantalus he was doomed to hunger, it only made him plunge deeper into the secrets of Jove. His only dissipation that autumn was to desert his studies long enough to act as best man while Gratia was transmuted into Mrs. James Endicott La Hogue.

### Chapter 74. Tungeten

When her little laboratory was ready, even to an air-tight stove, Jean moved in. She had her Lucretius, a recent text-book, a few chemicals, and her dog for company.

Far away her lost lover was deep in the study of carbon—so she thought. That must be an awfully difficult subject, and she must begin with something easier. She plunged into oxygen, and did so with as much joy as ever she plunged from a rock into her river. It did not spoil the St. Mary's to be made mostly of oxygen. She found it more beautiful than ever. The feel and look and taste and rush of it were all there, only now she was getting deeper into it. Her own body was mostly composed of the St. Mary's, and now a swim was like being stroked by one's own mother.

With great care she prepared some oxygen by heating potassium chlorate, and watched a bit of iron wire burn in it with dazzling brightness. By the same element her own body was daily burning, a slow and steady flame in the midst of the earth's vapors. But how amazing that the flame of oxygen burst out so rarely! It puzzled her that her island, though half oxygen, should be crystalline and cold.

She ran over the list of elements and was astonished to find them arranged in a sort of musical scale. Each octave began with a sharp metallic clang and then became less metallic. She wondered

why some great composer had not perceived this and written a symphony about it. In the evenings she began to improvise on the little old rosewood piano. When her fingers went flickering upward into the treble with soft murmurs or bright passion, and her delighted old father would ask her what she was playing, she would answer, "Oh, only oxygen."

She was equally astonished to find that if she read the successive octaves downward, the elements fell into families. Thus oxygen was related to sulphur, chromium, selenium, molybdenum, tellurium, and tungsten. How in the world could anything so light as oxygen be like anything so heavy as tungsten?

Sulphur was the only one of that family she knew when she met it. So she melted some crystals of sulphur and froze them into long needles, while Agricola lay by the little stove concealing his sulphur beneath his color. She knew now what a solid is, and that only crystals are true solids. As for sulphuric acid, which is perhaps the most useful of all chemicals, she chiefly wondered why it or anything else was acid.

The year 1919 came to a close, leaving her with a sense of almost nothing accomplished, but grateful that she had found a wonderful new interest to keep her from moping. If she could not share Marvin's life, she could follow him afar off and feel him nearer.

In the paper she read a list of famous persons who had died in the course of the year. She read such utterly different names as Carnegie, Crookes, Emil Fischer, Habibullah, Laurier, Liebknecht,

Osler, Fatti, Rayleigh, Roosevelt. How hard they had tried, each in his own way, to be of some use in the world! Carnegie had given the world libraries, Crookes had warned it against famine, Fischer had endeavored to make foods, Habibullah had ruled his savages. Laurier had kept two races from biting each other, Liebknecht had wanted the poor to be comfortable, Osler had healed thousands, Patti had taken people's minds off their troubles, Rayleigh had discovered something wonderful in the air, and Roosevelt had actually united two oceans.

And how were they rewarded? Well, Habibullah and Liebknecht were assassinated, and Osler and Roosevelt robbed of their sons by war. If Dr. Osler and Colonel Roosevelt could speak to her now, would they advise her to marry? She did not believe that they would.

### Chapter 75

January of 1920 came, and the river was frozen over. The flowing oxygen was solid enough for men and horses to walk on. There they went in beaten paths, warm water trudging along on cold! Jean had always been amazed by such miracles, but their potency was doubled for her now, and they kept her from breaking her heart.

Twice a week she and the dog tramped up the ice to the post-office, always with the hope of not hearing from Marvin. Any letter from him would mean that he had found a new girl. She ought to be hoping for such a letter, but somehow her wicked heart declined to hope.

In her little laboratory she was perfectly free to risk her neck with any experiment she chose. And considering that she had got the oxygen from potassium chlorate, and that Horatio had barely missed passing out by chlorine before he met his death by other forces, she found herself wishing to see chlorine.

She read that it was usually a green gas, though it could be liquefied and stored in steel tanks. She read that it combines with sodium to make table-salt, though how a green gas could come to look so sparkling white she did not understand. At first she thought she would coax it out of salt, but having no electric battery she had to abandon that plan.

It was like fluorine and bromine, curious things  
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of which she knew nothing. It was also like iodine, with which people paint themselves on the slightest provocation, though she suspected that soap and water will ordinarily do as well. It was furthermore related in some mysterious way to a heavy metal called manganese. She had not the faintest suspicion that manganese conceals twenty-five charges of electricity, or that its two undiscovered relatives conceal forty-three and seventy-five respectively. But her book gave her to understand that chlorine can easily be extracted from manganese chloride.

So she asked Ojeeg, who was now become so respectable that he was carrying the mail, to bring her from the Soo a little manganese dioxide. She wrote the magical words for him on a piece of birch bark, and next time he not only brought the stuff to her in the clearing, but stood by and watched her mix it with hydrochloric acid, heat it, and collect the chlorine in a bottle.

They sniffed it and understood perfectly why it choked soldiers to death. And long after Ojeeg left her, she stood pondering that greenish yellow mist through its glass prison. It seemed incredible that human beings would deliberately roll that death along the ground to fill the nostrils of other human beings. But it had been done, and when the madness again seized on men it would be done again. But there in her silent retreat among life-giving wintry airs she determined that no son of hers should ever be compelled to breathe chlorine.

## Chapter 76. Osmium

During the winter nights she slept long. When she dreamed, which was not often, it was always a happy dream. Mother was alive again and taking all the responsibilities, or Horatio was happily married and living across the river, or Marvin was again covering her with a blanket there in the rifle pit by the old fort. Once she awoke with a sense, ethereal and unashamed, that all night long she had been sleeping in his arms.

But these tricks of desire were quickly supplanted, as she lay there cuddled like a dormouse, by her habitual sense of wonder. Explanations of dreams seemed to her unimportant compared with the unexplainable fact that dreams seem real. The fact of the illusion always amused her. Every night even the wisest of mankind believes some absurdity.

Indeed God got along very well for a third of the time without the advice of his earthly children. Daily he gently slew them all, and laid them in comfortable graves, and let them stay dead for eight hours or so. It was a wonder that anybody ever came to life in the morning, but everybody did. What was more curious, everybody went about his daily task fancying himself the author of himself.

Nowadays she hardly ever got up to see the morning star, but contented herself with the assurance that it was there in the east. It was almost exactly the size of the earth, but not quite so closely

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grained. Venus was only five times as dense as water, whereas earth is six.

Blessed is the girl who can console herself with the densities of morning stars. She preserved a normal curiosity about physical whys and wherefores, which are the best medicine in the world for too much self.

She wondered why the particles of a metal stick so close together. Lucretius had said it was because the atoms were hooked. It did rather look as if in some way they overlapped, but then it also looked as if the atoms themselves were compressed. She wondered what force could be so tremendous as to squeeze atoms into iron, nickel, ruthenium, rhodium, palladium, and osmium, each a little denser than the preceding.

And what made a metal like sodium unite with a gas like chlorine to make table-salt? She would always thrill to the taste of a little salt on a stalk of crisp celery, but she would thrill a good deal more if she knew what really happened when those atoms wedded.

## Chapter 77. Iridium

For that matter, everything was wedded to something else. All the noble metals seemed to happen together. The osmium and iridium in the tip of her fountain pen were so much alike that they could be called by the name osmiridium. Perhaps all the world was like that, one stuff with different appearances. Had not her planet once been something very hot and uniform, which had cooled in many shapes?

One evening, as they sat before the glowing coals, she coaxed her father to talk about the one substance. He told her of Thales, who thought it water; of Anaximenes, who thought it air; of Heraclitus, who saw the earth as ever-changing fire; of the Stoics, who thought that God's reason is a creative fire forming the earth and preserving it, a doctrine which Lucretius could not abide; of Plato, who conceived earth as made of little cubes and fire of little pyramids.

For Ambrose Rich all these substances were evidently only forms of thought. He was chary of expressing opinions, but his daughter fancied that nothing was real to him except thought. For him the splendidly broken living coals did not fade into atoms but into spirit.

In Jean's mind they met no such fate. The indescribable glow, far too delicate and luminous to be called red, was to her the actual glow of atoms. She did not attribute the color to her mind. What

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she longed for was keener senses to see into the heart of things.

And if she was inclined to agree with Heraclitus, it is hardly necessary to ascribe her feeling to her wintry isolation or her longing for Marvin's warm clasp. It is human nature to love the fire that burns in its own veins.

She often reflected that anything will burn. Nothing is so solid or so wet but it can fade away in heat. Some day the whole round earth would vanish as a round knot of birch vanishes up the chimney. She was not to be deceived by the cold look of ice or silica, for you never could tell what might happen.

So February sped along and the spring of 1920 approached. The warm round crystal called earth made its way through the interstellar spaces and tipped its darkened pole into the sun's rays. The ice began to melt, keeping its chill to the last lump. Everything else began to expand a little, as if softly burning. Inert snails and frogs and buds began to swell. The pussywillows came forth in gray velvet and stood near each other like bashful lovers, for male and female created He them.

Presently the hidden fires began to glow pink in arbutus among the pines, and run like blue flame along the shore in violets, and then to fill the upland woods with the frank conflagration of adder's tongue. Jean went about feeling fire of every imaginable temperature.

She delighted to call it out of all sorts of things in her laboratory and out of doors. With a bit of steel she struck fire from every part of her island. And having abandoned the impossible task of play-

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ing the elements on her little old rosewood piano, she contented herself with making up a melody for some words of Browning:

Fire is in the flint; true, once a spark escapes,  
Fire forgets the kinship, soars till fancy shapes  
Some befitting cradle where the babe had birth—  
Wholly heaven's product, unallied to earth—  
Splendors recognized as perfect in the star!  
In our flint their home was, housed as now they are.

### Chapter 78. Platinum

That summer she was a good deal saddened by the news from Russia. In the broad valley of the Volga, already ravaged by the passions of armies, no spring showers had coaxed the wheat out of its matrix, and Samarans might soon be driven to devour their own children. She could not fully sense the image and horror of what was coming, but it was all a warning against marriage.

Yet Russia was rich in natural resources, and especially rich in platinum, which it had been using as coins. She had never seen platinum, and had no hope of seeing it, but she knew how precious it is in a laboratory. She knew also that because it is worth five times as much as gold, much of it hangs on the necks of rich women, who are utterly unaware of the sin they are committing. The whole earth produces less than ten tons a year, and every ounce of it is needed for crucibles or wire or apparatus, but the density of platinum is nothing to the density of human minds.

One thing about platinum interested and puzzled her. When finely divided it hastens the union of hydrogen and oxygen without losing any of its mass. It produces explosions without itself exploding. It struck her that this was a good deal like the rich women who owned it, but that it was also like electricity. She had a horror of explosions, but she had a growing interest in electricity. If George Gillies could find her some zinc and copper, she might be able to make herself a battery.

## Chapter 79. Gold

A year had passed, and still no word from Marvin. Evidently he had not yet gone back to the wonderful Gratia with the hair like spun gold and the eyes like gentians by the river's edge. But he had two more years in which to reclaim Gratia or find somebody else.

How like a dream were now that visit to the East, and the meeting with her mother's old friend, and the confession to Kate Coggeshall in the gloaming, and that gift of paper which might have been sold for a hundred thousand dollars! She, Jean Winifred Rich, had actually refused a hundred thousand golden dollars, flattering herself that it was because she had not earned it. How slenderly she had known herself! The real reason was that she could not accept money from the father of the man she loved!

Now all the gold remaining to her was the unspent double-eagle given her by Susan Endicott Hogg. No—there was the other tiny mass of it. Up on the hill lay a ring on a dear and crumbling hand.

During the magical autumn days of 1920 she was but little in her laboratory and oftener sitting by the grave beneath the pines. It was covered now by the scarlet berries of mitchella, on which the sunlight rested warm. And beside it Jean lingered as if clinging to the one thing intelligible in a chaotic

world. Her mother's love seemed about the only fact that she could understand.

Certainly she could not understand gold. It was a lovely substance, looking as if all the fires of a star had been compacted in one lump, and it had always been dear to poets. It was so beautiful that she would fain have given the Red Leaf a mixing bowl of the purest gold to mix her corn bread in. That of course was impossible, because there are so few grains of it on earth. To make up one-tenth of one percent of the rocks it takes all the gold and all of sixty-three other elements.

But this stuff so dear to the poets had also been cursed by every great writer from Isaiah down. It was saint-seducing gold. It was the cause of theft and murder and war. It meant misers and misery. She felt dimly that Horatio had been sacrificed to somebody's love of gold, but she could not prove it. All that she could do to help the world was to bring no more Horatios into it.

Just as her poor little mind was baffled by gold, so for the first time it was baffled by the gold of autumn.

The green had run back from the leaves of the maples into the trunks, leaving thin gold to bask in the air till the wind should tear it loose. The action of retreat stored the sweetness in trunk and root, but it was all the unintended deed of the tipping earth. So too the apples and pears and wild grapes were vials of sweet golden sun, stored without intent.

Or, if there was intent, it meant chiefly the scattering of seed, as if every plant wished to inherit the earth for itself. The very berries on her

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mother's grave seemed to harbor some such purpose. The weeds were even worse, flinging their seeds afar in sudden spasms or catching the fur of passing rabbits and clinging to such carriers. Thistledowns drifted along the breeze like airplanes bearing invaders. Tiny spiders set themselves afloat and drifted in gossamer, borne on the congealed silver of their own bodies to conquer the world.

Of all those seeds not one in thousands would survive, yet life poured them out unceasingly. They were produced unconsenting and uncomputed, and wasted unabashed.

This star of hers, which at the distance of a few million miles seemed a jewel, was in reality vast and awful. The mist of life upon it was a mist of blind struggle. A good map of any mile of it would show beautiful weeds and men and bacteria all wasting their life in the struggle for possession. It was beautiful, but it was horrible.

### Chapter 80. Mercury

And then, as the autumnal days grew lovelier, she could not help shifting the emphasis from the horror to the beauty. It seemed to her that she had never seen colors till now. Nothing was harsh, and all was balance. Her earth was full of happy marriages. Here a splash of crimson was offset by a field of grayish blue-green. Here purple lived with green-yellow, here blue with yellow-red. Whatever chemistry these married hues concealed, they concealed it like lovers.

From the balance of colors she was led again to the balances of chemistry. Especially the balance called water held her thought as she daily watched the river approach its hour of enchainment. Evidently the balance was not perfect, for water acts like an acid and will slowly eat away glass. She pondered the balance of acids and bases, and finally begged Mr. Gillies to get her some zinc, and Ojeeg to get her some copper, that she might make a battery.

The Scotchman complied, and on his next trip to town brought her a heavy bar of commercial zinc. But Ojeeg, leaving his wife to carry the mail, disappeared from home for several days and went on the war-path. From one old friend and another he ruthlessly took secret treasures—now a lump and now a spray of virgin copper. For some of them he had to pay, but what did he care? He had a

pension of fifty-seven dollars every month, not to mention other government money and the rewards of planting. Never before was such an electrode hammered into shape!

It did the work, and Ojeeg looked on in impassive silence when the acid began to gnaw the zinc into bubbles of hydrogen. Then when a bit of wire connected the two bars, and the bubbles shifted to the copper, he was sufficiently awed. He had always suspected that copper was full of devils.

But Jean, left alone, was the prey of thoughts less simple. As she watched the hydrogen exude from the zinc, which contained enough carbon or iron to start that flow, she wondered first if the whole bar might not be made of hydrogen. Then she recalled the terrific explosive power of those tiny bubbles. A few fragments of commercial zinc left by accident in the boiler of a steamer had been known, when the hot water attacked it, to give off hydrogen and blow the stokers into shreds.

Zinc, however, was tame as compared with its beautiful cousin, quicksilver. Mercury fulminate was the very prince of all the devils that produce explosion. She thought she understood now the elegant process which had destroyed Horatio. A bomb containing finely divided aluminum and iron oxide, and a bit of burning magnesium ribbon, came dropping down out of heaven. On the way the oxygen of the iron united with the aluminum and made a molten mass. This struck the exquisitely sensitive mercury fulminate in the shells, and this in turn exploded the stores of horror in the whole dump of ammunition.

That was the sort of thing that chemists were guilty of. Their brains were a thousand years ahead of their passions. They were savages with the intellect of angels. Who knew but that her own lover, in some fit of anger, might not be capable of just such horrors? She would not marry him!

Eut what force can prevent the human eye from seeing and the human mind from inquiring? As the mercury continued to fall and the river began again to sheath itself in blue crystal, she simply could not help wondering why the lovely stuff in the thermometer was so different from gold. Quicksilver was just a trifle heavier than gold and yet a liquid! Gold would stand any amount of pounding, and mercury could not be pounded at all.

The marvel of it wearied her, and she turned aside from her studies to prepare for Christmas. She hungered for the sight of little children. She would ask the grange to bring all of them on sleds to her house for a party, and she would make them toys with her own hands.

It must be confessed that she was happier doing this than in trying to think out mercury. To fashion a hazel nut into the brown and black head of an Indian baby, or to split cedar into fairy supports for the wings of a toy air-plane—this was nearer her intellectual size.

December sped along, and her father cut a superb spruce for a Christmas tree. She festooned it with popcorn and wished that she had just a few of the glittering baubles which gleam among the branches of such trees in town.

Then a day or two before Christmas Ojeeg brought her, along with a present from his son, a

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box containing a whole wilderness of ornaments, together with a letter which ran as follows:

Dearest Jean Winifred:

I can make no apology for addressing you as if I knew you, and hope you will forgive me. My husband is always telling me that he owes you a vast sum of money, but that is not why I am sending you the trifles that used to brighten our tree when the children were little. When I think that my Augustus is nearly forty and that you and Anita are grown women, I feel very old and in need of comfort.

Dearest girl, I must not speak of what is nearest to my heart, but I am sending you love with this Christmas greeting. Some day I shall hope to know you, and you will tell me of the mother whom you never forget.

Helen Marvin Mahan.

### Chapter 81. Thallium

It was such a note as might have been written to a girl disappointed in love, but Jean felt sure that it was no such thing. Marvin loved her still, and his mother knew it and was pleading for him.

It had to be answered, and after Christmas a very tremulous girl managed to write as follows:

Dearest Mrs. Mahan:

My mother would have loved you dearly for what you have written to me. And if you could have seen the faces around our Christmas tree, you would have been comforted for your own children who have grown so big and splendid. One of the smallest boys—his father works on the patrol boat—kept pointing his little pink finger at the biggest ornament and saying "Moon." So finally I had to give him the moon to carry home. It made me think of the very first summer I can remember, when I started up the hill to get the moon as it rose through the pines. I have got over doing that, but it has not been easy.

Now that Christmas is over, our life slips along in the same quiet way as ever. My father stays perfectly well in this cold air. Just now he is sitting on the porch all wrapped up in his old buffalo robe and wearing his old beaver cap. One squirrel is sitting on his shoulder and another on top of his cap, eating hazel nuts, while he is probably thinking out the form of some lost Scythian word from which "squirrel" is derived. He says that the Greeks were not very critical when they thought it meant "shadow-tail."

Will you please give my love to Mr. Mahan and to Anita? I envy her the work she does for the soldiers. And please believe that I am always your grateful

Jean Winifred.

Having thus evaded a mother's love as well as she could, Jean again tried to lose herself in the affairs of the universe. Again she watched her star swing through its wintry orbit, a process which thrilled her with its accuracy. To be sure it seemed to have no purpose, but she no longer felt obliged to defend God's purposes to anybody.

She extracted what pleasure she could out of another recurrence—that of similar qualities in boron, aluminum, scandium, gallium, yttrium, indium, the rare earths, and thallium. These were fresh disguises for the one substance, whatever that might be.

Her hold on it, in this group, was through common clay. Her rough old star, all gleaming with silica under the moon, had so long been washed with showers that now it was fairly smooth and finished in aluminum silicate. Wonderful stuff it was, this clay, which could be caught in its festal moments as sapphire and ruby, and which could be molded into wasps' nests and porcelain vases and brick houses. She could chase its finer essence, along an electric route, into the silvery metal of her best sauce-pan.

Slowly the sun's rays began to straighten, and the clay began to show through in spots. The river resumed its liquid phase, and the deliberate delicate lichens grew faster. Young shoots began to veil the maiden birches in a mist of green. Below them emerged the slender ferns, downy and curled. Aluminum was laying a restraining finger on them, lest iron make them grow too fast.

By and by came a bluebird, little guessing that aluminum had a part in his azure. The last of

March arrived, and she read in the paper that John Burroughs had died. She grieved at this, for Mr. Burroughs had been one of the few people who really seemed to love the earth.

She broke her treasured double-eagle and sent for his last book. She found it very temperate and wise, all about accepting the universe. But somehow he remained very old while she remained but two and twenty. He was like her father, apparently quite reconciled to Horatio's death.

He did not believe in a God of love, but she noted that he kept referring to nature as "She," just as Ojeeg did. Evidently nobody could escape some sort of religion, and naturalists preferred their mothers or grandmothers as their models for God. But if she had to think of the earth as Nokomis, her grandmother, she would never call Nokomis "impartial." The earth wanted her to marry Marvin Mahan. The earth was just stupid enough to keep urging her to do it.

She watched the spring matings and wondered that Mr. Burroughs dared use such a word as "impartial." Her thrushes, pouring out their heavenly celebrations of marriage, were merely notifying the hawks and squirrels where the nests were. The hawks and squirrels listened with amused ears, knowing they could count on maternal love to furnish them with warm meat of baby thrushes. So statesmen listened to mothers' lullabies, which would always assure them armies.

But in spite of the bitterness which the innocent old man thus aroused in her, she presently owed a debt to John Burroughs. She found him ironically asking if it helps us to think of the soul in

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terms of light, or radioactivity. She pondered that and differed with him. It certainly did help her to think of Horatio's soul as light or electricity. As for radioactivity, she had never thought of it at all. She knew the word, but it had meant no more to her than the phosphorescence that she saw in Wah-wah-taysee, the firefly.

In the Britannica she at once found an article on radioactivity. It had long been lying there unobserved, quite after the fashion of other divine riches. She read it with amazement, and though it offered no theory of matter, arose with the conviction that matter is built up from hydrogen, which is merely the smallest neutral unit of electricity. She had found the one substance. She guessed that all the lovely colors and shapes of earth are made by the different arrangements of electricity.

By the time supper was over she was living in a new world, feeding on electricity. Her star had become electric to the core. Sunlight was still reflected from the sphere, but the sphere itself was lightning.

After she washed the dishes she went out and looked at the universe. The neutral lightning called the St. Mary's was flowing peacefully. The neutral lightning called her island seemed immobile, but was vibrating in every atom. The pines were not coruscating, but garbed their thunderbolts in shadowy green.

And so the spring of 1921 passed into summer, opening her eyes. A billion years ago this gem beneath her feet had been an ammunition dump constantly exploding. For some reason God had slowly closed His hand around it and almost hushed it.

### Chapter 82. Lead

Almost, but not quite. Lightning still escaped from earth in the form called life. Wherever there was water, it stole forth as liquid voltaic cells. It was balanced and bottled in animals, but always enough escaped to drive them.

It drove fish through the water like darts. It drove the wings of flies so fast that no eye could follow them. It flashed out in the tongues of snakes. In her own body it carried messages from her fingers to her brain at the rate of several miles a second.

Such were the thoughts that haunted her all that spring, and a dry hot spring it was. There seemed to be no more rain along the St. Mary's than there had been the summer before along the Volga. Even in the clearing, where the grass had been ing lusty for a year, the ground began to look yellow. The gift of half a dozen sheep from Chase Mahan arrived, but they found little food.

The mosquitoes, which usually hold their revel for about a month along the river, failed to come. On the other hand, the mayflies, which usually lie hid in the river till July, arrived a month earlier.

Jean watched them one hot evening from her wonted seat on the Tarpeian. They had been suppressed in their shells for two years, and now burst forth for the one day of passion that should end them. Vast swarms of them hovered and hummed,

seeking no food but only their random mates. The female received the fertilizing flash from the male, laid her eggs in the water, and floated dead near the dying mate. The watchful herring, themselves like flashes of living lightning, gorged themselves on dead lovers.

The electric swiftness of the whole tragedy appalled her, and yet human beings were not much slower. She herself had felt the lightning-flash when Marvin first looked into her eyes, and her mother had confessed to feeling the same thing on meeting Ambrose Rich.

She remembered one of the first things that Marvin ever said to her, about the likeness of a brain to a burglar alarm. How true she had found it! How easily she had tired of her studies and plunged into action to escape thought.

She remembered the little folks who came to her party at Christmas. Their dear little arms and legs could not stay still a minute. She wondered if the Christ-child had been like that, so full of electricity that he could not be cuddled except when asleep.

She wondered many things about the Christ, who was tempted in all points like as we are, yet without sin. What could that mean? Of course Jesus did not give way to the urge of anger or envy or avarice, but how strong he must have been not to have given way to the passion of love! In that sacred body there had been the same store and potency of fertilizing flashes, millions of them in comparison with the one cell which is fertilized, yet all those lightnings of his youth had been restrained.

It must be otherwise with men of her day. The unrestrained hatred shown in war must be a sign

of other unrestrained passions. They who hurled rivers of lead at each other must—she stopped, remembering something that had caught her eye in a sociological journal sent for some other purpose to her father. She remembered with horror the assertion that lead deliberately produces two million abortions a year in the United States alone.

She tried to forget it. She must think of the million tons of lead that are mined every year for good and honest purposes. Men do try to be decent.

The weather continued terribly hot, and she and her father had all they could do to save their precious garden. Every evening they carried water from the fire-ditch, and saved some of the green from running back into the roots. But the farmers all lost their hay and had to cut their grain for fodder. This was what life meant—or would mean—ultimate uncertainty of food.

The fish died by the hundreds and had to be gathered up from the shore and buried. Every day she saw large perch floating by, each a lost and golden dinner. Once she saw a sturgeon, a hundred pounds of wasted food, weltering to the parching wind. But these waters had been robbed of tens of thousands of sturgeon, making this wretched swollen thing almost the sole survivor. Out west the salmon were going the same way, and the Indians who depended on salmon would have to die out.

She read in the papers that the same terrific heat was felt even in Europe. But she had no hope that such warnings would be heeded. The birth rate in all the European countries was rising rapidly. England had made a net increase even during the

war, and Vienna—the hardest-hit of all the great cities—had recovered and was breeding plenty of rickety children.

Such were her inmost thoughts during that burning summer of 1921, and not one of them did she breathe aloud. In fact the more terrific the heat, the more she seemed to flourish. When she was not cooking or working in the garden, she was mostly in the water. She would swim out as near to the steamers as it was safe to go, and sometimes nearer, and from the bubbling sapphire flirt like a mermaid with the deckhands.

One luminous evening her astonished old parent saw her swim across the channel and land in Canada, half a mile away. The glass that he had used half a century since in the war now revealed her perched there upon the pier. Half an hour later she was dancing on the pier in her bathing suit, with several Canadian lads and lassies. He rowed across for her and brought her home, a very bacchanal of laughter.

Curious are the freaks of lightning.

### Chapter 83. Bismuth

Her twenty-third birthday came, and with it a letter from Mrs. Hogg, who evidently wished to know when she would have to furnish that trousseau, though she did not say so in exactly those words. Also she seemed to think that Marvin had kept Jean informed of all things pertaining to Wickford and Chicago. She made references to her new grandson, Asher La Hogue, now more than a month old. She had not seen him yet, but understood that he looked like Gratia.

This was the first that Jean had heard of Jimmy's marriage or his transmogrified name, but her heart leaped up because the child was not Asher Mahan. She was willing to grant him the most beautiful boy baby ever born, with eyes of gentian and hair of gold, and enough latent business ability to manage the biggest factory on earth.

Then to rebuke her wicked heart for singing within her she reminded herself that a baby more or less is of little importance. There in the presence of the Laurentians, which existed before any life arrived on earth, it was easy for her now to deride life. Life was merely an incidental product of thunderstorms and sunlight.

It had taken a hundred million years to make little Asher, but he was essentially an accident. The chemistry that produced him could roughly be understood by anybody.

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Positive and negative electricity had blocked each other and turned into a planet. If the blocking had been perfect, it would have produced a planet of bismuth, the heaviest element that does not disintegrate. But the actual earth was not even lead or gold or tungsten or iodine. It was mostly iron, a comparatively light stuff, and shaded off on the surface in ever lighter elements—calcium, potassium, chlorine, sulphur, phosphorus, magnesium, sodium, fluorine, oxygen, nitrogen, carbon, hydrogen. All these occurred in a baby, and a baby was an occurrence of these.

These were the stuff of rock and air and water. The lightnings tore nitrogen out of the air, the rains washed it down upon the rock, the moistened rock absorbed the sun, and presently there was a baby. Of course she could make it seem less precipitate by taking into account the hundred million years of evolution, but what do they amount to in the life of stars? A baby is something too unadvised, too sudden, too like the lightning which doth cease ere one can say it lightens.

It quivers on the planet and presently acts like lightning. It wants to go as fast as possible and feel the thrill in every nerve. It wants to drink fire out of a glass, and dance all night. It wants to ride wild horses and the wild winds. It wants to fight and be praised for fighting. It wants to kiss and clasp and separate without much responsibility.

What is more, it manages to do these things. The old folks, she reasoned, call it immoral because they are past such achievement, or perhaps because some inarticulate instinct warns them that there is not food enough to support so much combustion,

but the actual life of nature's darlings is electric and irresponsible.

She felt a good deal of sympathy for the sinners. She had not been called the humming-bird for nothing. She was American, as all humming-birds are, and had small use for the languors of Africa or India. By the same token she loved a humming motor and a humming picture-show. Marvin was doubtless having oceans of fun in making fuels that would render all sorts of humming possible.

He was working, she thought, in carbon compounds, and though she knew little about such matters, she knew something. Carbon compounds, such for instance as the alcohols and atropine and quinine, were very different from such horrible things as lead. She knew too that decent girls in every civilized country are getting acquainted with them for a certain reason.

And the reason was that a country like Holland, with a population of five hundred human beings to the square mile, was simply obliged to control its birth-rate. All the world would have to come to that point of view within a century. By closing their eyes to the flashing facts, good people were simply driving the young to vice.

Might she not, then, marry Marvin and share his intellectual gladness and his animal gladness without becoming a mother? Why should unconscious cells stand in the way of her happiness?

The question was no sooner asked than answered. All her heredity shrank back and cried out against it. She thought again of Phosphor, the morning star, and how his element lay hidden in her cells like some divine and sacred light-bearer. The ele-

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ments were subtly wrought within her that some child might come and smite himself into them, as once the Christ-child, bright as any fire, came and smote himself into the bread of Sangreal. Rather than prevent him she might better bring forth many sons to bear the duress of the world.

### Chapter 84. Polonium

That conclusion was her first sign of yielding, and it was not much of a sign. But when in December she came to think about polonium, her determination was almost shaken. Polonium was the discovery of a woman and a mother. Madame Curie was not afraid of life.

Such a woman had a right to be born, even though as a child she ran the risk of being torn in pieces by the claws of the Russian bear. If one could only hope for such a daughter as Marie Curie! It was not the death of descendants that Jean objected to, or even their tragic death, but their death for no demonstrable purpose.

Though debarred from seeing polonium, she knew enough to be awed by the accounts of it. It was utterly different from anything she had studied. Whereas bismuth apparently lasts forever, polonium—hardly separable from bismuth—lives less than five months! It slowly and steadily explodes from within while seemingly peaceful without! The flying fragments of its atom can be made visible—can be made to appear like fireworks in a fog.

Marvin would have been overjoyed to show her the performance, could she have visited his laboratory. He would have let her bend carefully over a highly charged little engine which was revealing the luminous tracks twice each second. In that little glass-topped chamber the eighty-fourth element was fiercely giving up the ghost to become the

eighty-second. Out flamed the unbalanced helium atoms like a sheaf of spreading sunbeams, and often a ray was deflected by hitting some invisible atom.

Admiration for Madame Curie made her dream for a while of motherhood, but January dispelled the dream. Though Congress had voted twenty million dollars' worth of food for the starving Russians, there was every prospect that millions would perish. Jean longed to do something, and spent what was left of her double-eagle for Canadian cheese and sent it to the Red Cross to forward. And such is the natural desire of the illogical human mind for heroic action that she would gladly have died for any one of those Russian children—who ought never to have been born.

But, although Marvin had from time to time sent to Asher Ferry some brief printed article, neither Marvin nor Jean knew of a certain exchange of telegrams which took place on the thirtieth of January, 1922.

Chase Mahan, being then in San Francisco, received from Asher this message:

Please inspect that laboratory which was dedicated night before last in Pasadena.

Chase wired back:

Inspected it several days ago. Do you want Marvin to see it?

To this query he received a most satisfactory reply:

Our director should by all means see it, and on his way back should consult with my architect.

### Chapter 85

The spring months of 1922 were the perfection of growing weather, and Jean rejoiced for the farmers, but elsewhere on her planet there was plenty of trouble to keep her determination strong. The coal strike reminded her that there is very little of anything left on earth to burn. The bloody condition of Ireland and the bloodless condition of Russia were new proofs that food is hard to get. In Germany every mother's son who grew up devoted to the people was likely to be assassinated. That was an old story on earth, and the assassination of Dr. Walter Rathenau for making electricity and coal cheap merely confirmed it.

A day or two after that death a sudden freeze killed all the raspberries on which she had been counting for next winter's suppers. Then infusorial blight fell on all the potatoes, and she really did not see where to get money to buy potatoes. These were trivial losses, but even trivial losses sometimes affect the state of mind.

July came, and for the first time in three years she once more saw the Little Pine. He had completed his high-school studies and come home for a vacation. He remained unspoiled after playing football and studying chemistry and associating with girls. Jean could not help sharing the Little Red Leaf's pride in him.

### Chapter 86. Niton

As July sped along she realized that she must balance her accounts, for Marvin would surely come. She was going to refuse him because life is explosive; because the struggle for existence is too intense; because in order to live men must immerse themselves in the immediate task; because food will be harder and harder to come at; because when deprived of it men are like Eskimo dogs, killing each other to secure the fresh blood and red warm meat; and finally because even when they have enough to eat they will go to war to get selfish luxuries.

Perhaps when her lover arrived he would stay three or four days and argue the case. If so, she would be as steady as niton, which lasts three or four days and is radiant all the time. Though it refuses to unite with anything, it can be reduced to a rosy solid, colder than the coldest ice, but cheerful.

So she dwelt on the joys of earth. Each night she lifted the earth, threw it into space, and watched it come home to her. She saw its whiteness take on colors. She saw it draw near with cracking and crying of thunder till it yielded the impression that she willed—hues that do not blind, sounds and sweet airs that give delight and hurt not.

It swam into her ken all misty green, bedashed with mosses and herbs and trees, the lowliest forms

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of living lightning. By day they eat the rock and breathe what we cannot breathe, by night they laugh and whisper and breathe like us. She saw their marriage flowers, and loved them with a sacred love.

All among the green roved the red of animals, seen roseate through its veils of hyaline restraint and organized in batteries, ready to fly, swim, dive into fire, ride on the curled clouds, or run upon the sharp winds of the north. It moved in lines of living force around some pole called home. Here was a hive, encircled with brief honey-seeking flights. Here was a nest, encircled for ten thousand miles with flash of wings. And here was a polar point beside the sea, a slender peninsula encrusted with clays, a city of towers, the work of wonderful males. From it sprang rootlets of lightning over all the earth, freighted with friendliness.

And whether on land or sea, men often worked as one. They were fierce and dangerous creatures, and she did not intend to increase their numbers, but she could not help thrilling at their loyalties. They slew their enemies on the slightest provocation, but what they did for their friends was simply glorious. They stood by each other with contempt of death.

### Chapter 87

When August came and she knew that any day might bring the test, she felt her courage ebbing just a little. As a panting man longs for more alkali in his blood, so she longed for new courage.

She fancied ways out. Suppose she fled from her lover and hid herself in a city. But that would leave her father alone, a desertion not to be thought of. Suppose she carried her father off and earned a living for them both. But that would break his heart. Suppose she lied to Marvin and said that she had ceased to love him. But she really did not know how to lie.

She turned back to history and harrowed her soul with horrors. She reminded herself that excess of population has driven every race to expose its children. She saw Sicilian graveyards opened and hundreds of babies that had been buried alive in earthen pots. She saw the silver sails of Athens unloading excess of life on every island, and the rock called Tyre unloading its slums on Africa. She saw Europe unloading itself on America. She even hunted up in Plato and Aristotle the passages in which both those noble writers sanction abortion for the good of the state.

### Chapter 88. Radium

But in spite of it all, her sense of pity seemed to be going. When the twenty-third came, and she read that another gallant young leader had been assassinated, she could not mourn him deeply. Though nothing could be stupider than to slay Michael Collins, his earth went on shining in the grave. She could not bring herself to assert that such a youth ought never to have been born.

She had read a great deal in the papers about radio-telegraphy. Apparently the year 1922 would be remembered as the year when all the boys in America began to talk through empty space like gossiping seraphs. She wished that Horatio could have lived to see the day. How tickled she would have been to hear from Washington such words as these: "Get ready! Your brother Horatio is on the ether." If all the boys in the world got acquainted with each other by such means, maybe peace would come after all—some day.

Occasionally she had seen some reference to the deeper mystery of radium and its terrible, almost inconceivable energy. She earnestly hoped that nobody on earth was trying to find anything like it but greater in quantity. Given such a power, the savage human race would destroy itself in a year.

### Chapter 89. Actinium

As she had no notion of Marvin's being engaged in virtually that search, her will to refuse him continued to lose weight by fits and starts, like actinium.

On the afternoon of Sunday, the twenty-seventh, she restlessly rowed round into the creek after white lilies. She gathered a score. Then, as she leaned from the dory and dipped her arm into the brown water, she caught sight of a speck of green gelatin on the stem of a lily, and lifted it in.

It was hydra, and about ready to bud. She placed it in her cup, and presently the daughter parted from the mother.

Hydra was virtually immortal, and would go on living as long as it could find food, which might be for a thousand years, and every time it was a little short of food it would produce another daughter. Such immortality was not worth having. Life that was worth anything was precarious.

And the history of life on earth was the history of steadily decreasing fertility. Species ran out, families ran out, but always in the effort to get a finer product. A water lily, living but for days, was infinitely better than hydra.

### Chapter 30. Thorium

She dropped the two animals back into the water and began to row homeward through the hush of the Sunday afternoon, her bashfulness returning. She could not understand why, having admitted so much, she still hung back.

But Marvin might well be patient, for it had taken thousands of millions of years to coax the bashful atoms into her young body. Once her carbon had burned in the white incandescent smoke around the sun, and later fled embraces through the storms of earth and countless creatures that never would be man. She was at least as old as thorium, which lay radioactive for twenty billion years before any lover seduced it into a gas-mantle, and which even then refused to glow till a trifle of cerium set it off.

She rowed her lilies home, and trimmed their porous stems, and floated them in a wide bowl of glass, where they presently closed their eyes for the night. And her father, coming to supper and seeing them on the table, beamed with delight.

"I'm sorry, daddy, that they are all closed up."

"What, apologizing for lilies? Horace would say that even this gold is better hid. But there's a heart of gold that has been hid from her old father almost too many nights."

"Why," said Jean, "I've told you a lot of intimate things—for instance that I happened along

in the greatest year that ever was, when Madame Curie found radium."

"Yes, child, but you have been almost as unknown to me as radium is. I might count your life by seconds, and plead that every second brought a new Jean. I have loved them all, and fancied all the millions mine, but I catch but glimpses of you as you grow."

"Daddy, you talk as if I were a movie. But some day, when our ship comes in, we'll go and see a better show than that. I'm dying to see radium in a spinthariscopes. It has simply changed the world."

"Wasn't the world wonderful enough without it?"

"Yes, but you can't prevent such things from being discovered."

The old man meditatively buttered his toast, and nodded.

"I couldn't, for instance, prevent a certain young man from discovering my daughter."

Silence.

"Jean, darling, once you asked me why I was so late in discovering your mother. I am willing to tell you now. I was blinded by the fear of Nemesis for what I had done in the war."

Jean quietly set down her teacup.

"Father, have you never felt that Nemesis overtook you?"

"No, I killed men for an abstraction, but an abstraction is the only thing a man can be sure of. In a world so dream-like that even one's daughter eludes one, there is nothing to tie to except ideas.

Horatio died for an idea. I will not blame myself that my boy acted in good faith."

Again silence. At last she said,

"Will there be more wars?"

"Yes. All this incredible wealth that the scientific men have showered on earth will be fought for again and again."

"But the men who produce it never fight for it."

"No, because they live in a world of their own, the only world where communism works. They tell all they know, they share every thought, they give away their secrets, because they dare not do otherwise. They love their mother earth, and so they are bound to be martyred."

Still more silence, while Jean's teacup remained untouched, and her sweet eyes were full of pain.

"Daughter, we have long lived on very little, thanks to your creative economy, and I can't see that you are less fair for all your suffering. Should you grieve if now I gave away a part of my land to needy ones?"

"No, father."

"Then I am minded to do it—in fact to deed them all my holding, retaining only what the foolish Lear retained."

"Can you trust them?"

"Yes, because they wish to make use of your brother's name."

"Are they crippled soldiers?"

"Yes, in a sense, but their enterprise is scientific. Over where your laboratory stands they wish to build the Horatio Rich Laboratory of Physical Research."

The forgetmenot eyes filled with tears.

“How very, very beautiful! But how came they—why, this is Mr. Chase Mahan’s doing!”

“Even so, my darling. It seems that Mr. Mahan is much interested in the very thing you wish to see, namely radium. I shall not attempt to explain matters that are beyond me, but I dare say that crippled soldiers sometimes receive benefit from radium treatment.”

### Chapter 91. Brevium

The mysterious news was wonderful! Men of science would come and live near her—perhaps in the woods across the creek. But her chief perplexity as she washed the dishes was whether the miracle would include Marvin. Probably not, because he was not a physical research man, much less a medical research man.

When the dishes were finished, she went down to the shore, Agricola following as usual. She mounted the rock and looked toward the west. The birches were doing off their gold to stand in silver. The hill was dark, but the sky was rich and deep. She turned toward her island, over which the moon would later rise, and saw a flotilla of little frozen clouds. They seemed like Dante's celestial rose of white, each petal a redeemed soul. They were more angels than she had ever seen men in one day, and the littlest petals were the souls of children, which always behold the face of their Father. Under this so sudden enchantment the wonder of her father's news was gradually forgot.

Her eye traveled up the river, and her brother seemed curiously near. How often she had seen him come sailing home, with brown throat bare to the winds and head thrown back to snuff the breeze.

Now all was changed, and she could not imagine him. What body celestial might he wear? If she could only catch one glimpse of his pure radiance, she would not be afraid. She would not act like

the Little Red Leaf, to lock the door against a ghost even though she believed that Penaycee was safe in the lodge of the reindeer. She knew that in seeing Horatio's body, with brown throat bare to the winds and head thrown back to snuff the breeze, she had seen but the least part of Horatio. How curious it all was—this ancient language that everybody spoke, about bodies and souls. How utterly it failed to fit the scientific fact that her brother's body was of finer tissue than any imaginable spirit, and that it ended only in the stars.

She could think no more, and turned her gaze to the ore-boats coming up the river. They were very numerous this summer, these big instinctive animals hunting their prey so quietly. It took each one some three or four minutes to pass her island, which eclipsed each constellation in turn, but they advanced as inexorably as fate. Thus, in a day or two, Marvin would be coming.

She seemed past caring. She would just say no, and not attempt to explain. It was like death—it had to be gone through, but only once. She had heard that a drowning man lives through ages in a few seconds, but if ever she had to drown, she would set her teeth and stand it.

Agricola moved a little in his sleep and powerlessly barked in his throat. Long accustomed not to chase his natural prey, Agricola sometimes took it out on rabbits in his sleep. She was sure he never quite caught them—they changed and evaporated. She drew her hand softly along his head, and the noises ceased.

By this the moon had risen. She laid her own head on her arm, moved her back till it touched his, and drowsily watched the boats. Cities they were, forerunners of the greater cities that would cover the earth till there was no more solitude or beauty. Here came the largest of all—she knew it in the moonlight as it reached her misty island and disappeared.

How long it was in passing! An hour, a day, a year. Many years. Millions of years hiding it on the misty river. She watched for it in vain, and in its place saw—something else!

For there in the mist of the river Horatio seemed to stand beneath the moon, throwing her a kiss. And at that signal there were other faces beside him, growing in number like the opening petals of a rose. Tier on tier, a mighty orchestra, retreating upward till they were pearly dim, hiding the moon. Then arose a strange sweet music—voices of young stars—cry of a heavenly army—men and maidens chanting her father's hymn. In their midst stood Horatio like another father, loved by the unborn who were not his own, yet whom he had loved with love divine, all love excelling.

With a thrill of unspeakable joy she awoke, and saw the great steamer emerge from behind her island.

### Chapter 92. Uranium

The next morning the sun rose with a halo cast by prisms of ice in the upper air, and presently a strong west wind sprang up. Jean calculated that it would increase all the morning, perhaps all day, till it brought lower clouds from the storm center and then a gentle rain.

It was Monday, the twenty-eighth. Marvin had promised to arrive before her birthday, which would be Wednesday. He would not leave his arrival till the last uncertain moment, and therefore he would come today. Her confidence was childlike and absolute. Theoretically he might be struck down by pneumonia or lightning or an automobile, but in fact he would be on the mailboat when it reached Upper Encampment at ten o'clock.

Then he would borrow Mabel's skiff and attempt to row down. But by that time the waves would be very high, and to come in a skiff would be dangerous. Therefore she must go and get him.

But first she must provide for dinner. She would give him perch. She would give him strawberry shortcake made with preserved berries. So after breakfast she slipped out to catch perch. She found herself fishing with savage glee. Murder seemed natural. The prospect of crunching them in his company thrilled her. Together they would set their teeth in those delicate bodies, that opalescent nitrogen.

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Her golden prey captured and imprisoned, she set out for the north. Already the rowing was hard, but she hugged the western shore for a mile, turned her bow, and shot across the river to the pier. Then she stood watching. The wild west wind tousled her blossom of hair and pressed her raiment against her young bosom and exquisite limbs. By and by the postmistress joined her and was likewise sculptured.

Ten o'clock, and the punctual flock of white appeared in the north, with a banner of precious carbon flung eastward. She watched the prow. On and on it came, silent, little, and dramatic. Presently the whistle sounded, and the boat swung in.

And now she saw him! He had not been struck down, but had returned as surely as a planet, as faithfully as an Indian who promises to be at a certain tree on a certain day in a certain moon. He stood on the deck in the very prow, straight as the flagstaff beside him, and waving his cap.

The pier groaned with the steamer's impact. She caught the flung hawser and fastened it round the post. She did not even look his way as he leaped ashore and shook hands with Miss Mabel, but stood at attention till she heard the mate's order to cast off. Miss Mabel departed with the mail-sack on her shoulder and her shawl blown stiffly out. The steamer churned the water and was gone.

"Glad to see me?"

The wind tore the words from his lips.

"Of course."

"Knew I'd come?"

"Of course."

"Won't you shake hands?"

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She obeyed. Then she led the way to the dory and thrust his bag far up under the tiny deck to keep it dry. She did not intend to ship any water, but you never could tell.

She pushed out and began to breast the waves, so that later she might safely turn and run before them. The wind sliced the top off an emerald shell and blew it in his face. He laughed, tucked his cap into his pocket, and let his hair blow free. She loved the slight changes that time had wrought in him—just the least suggestion of a wrinkle left on his brow by hard thinking, and a look in his eyes as if he had gazed on things eternal. He kneeled before her as she rowed, so that he could hear what she said.

"How's the coal?"

"Haven't thought of it in three years."

"I thought you were specializing in fuels."

"So I was, long ago. Your father writes me that you have been studying chemistry yourself."

"Oh, just playing. Tell me what you've been doing."

"Studying the atom. Stealing the ideas of—" and he named a dozen men.

"Those names mean that you have been studying radiochemistry."

"Wonderful you should know them."

"What did you say?"

He leaned forward till their lips almost met.

"I say it's wonderful that you should know such names, but quite unnecessary."

She gave an angry pull that jerked him back into his worshipful posture. Then she smiled, reflecting that it would not do to get angry—that anger

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was unscientific—that anger was proof of ignorance. He thought it unnecessary for a creature of instinct to know even the names of physical chemists, and he was quite right about it.

He leaned forward again.

“It’s a glorious advantage for you to know some physics and chemistry, since you are going to marry the poor devil who has the responsibility of organizing the Horatio Rich Laboratory.”

The oars hung in mid-air with surprise. The watchful west wind swung the boat to leeward and filled it with a foot of water.

Instantly she was herself again and running before the wind. In fact the unaffrighted boat ran better for its load, though now another inch would swamp it. Marvin began humorously to bail out with an old tin can that looked like battered silver.

But Jean, though guiding her boat with perfect skill, was more deeply plunged in thought than ever she was plunged in her river. Last night she had imagined drowning, how she would set her teeth and stand it. Now she knew that she would have fought like any tigress to reach her mate. She would have set her teeth as in childbirth. She would have struggled to live till she bore him a child.

The battle was over. Instinct had won. She was doomed to motherhood, and her heart was singing with terrible joy.

Marvin with his battered silver still knelt in the water, reducing it inch by inch. She did not speak to him again as on they swept before that wind and that passion. Nor when they reached the upper

island did she swerve in, but swept onward to her own.

The little bay received them quietly, and they mounted the cliff. She led the way to a snug and sheltered cranny in the silica, where gray moss had gathered deep. She tore away enough to reveal the stone beneath, and they kindled a fire. She took off her wet moccasins and placed them near the good heat. She unlaced his shoes, drew them off, and set them beside her own. She seated herself in the moss, drew him down beside her, put her arms about his neck and pressed her lips to his.

"Now tell me about the laboratory."

"Well, the other men will live on the west side of the inlet, but we will live with your father."

"That's nice. Am I choking you?"

"Yes, but it doesn't matter. Am I crushing your ribs?"

"Yes, but it doesn't matter. Marvin, I don't know any more about physics and chemistry than the babe unborn, but could you please explain in words of one syllable what you are going to investigate?"

"The atom."

"Why?"

"Because it's fun to investigate things."

"Would you give only that answer to your father?"

"No. I'd tell him that if we don't release some of its energy within a century, our children's standard of living will be too low to support laboratories. And if we don't succeed within two centuries, the world will starve."

She smiled as Cornelia may have smiled when her boy Tiberius set forth to prevent Roman poverty, Roman starvation, Roman infanticide, and Roman war.

"It's all right, Marvin. You can't help hoping, and I can't help loving you for hoping."

"Darling, you don't understand. Let me show you."

And eternal youth went and brought his panacea. Other youths bring other panaceas—laws, books, crosses, machines. They bring laws that none obey, books that nobody reads, songs that are soon forgot, crosses that are mocked in jewels, serums that save the unfit, telephones that transmit hate and lies, dynamos and turbines that merely increase labor—and mother believes in them all.

From his bag he brought a little instrument containing a pinch of salt; nay, not so much, not a pinch. He took off his coat and spread it over both their heads as they lay in the deep dry moss. When minutes had passed and her eyes were grown accustomed to the darkness, he bade her look.

There it was, the miracle she had longed to see. She held within her hand a flight of stars, faint as the dawn of hope, straight as arrows, radiant as heaven. Were they stars of Bethlehem, promising peace on earth? She could not say. She could only remember that Mary of Bethlehem bore a son, and that Marie of Poland bore a daughter.

"Jean, do you realize what power is going to waste before your eyes?"

"Yes."

"It's quiet, isn't it?"

"Quiet as God."

"Don't you trust Him to give such power into the hands of your children?"

She flung aside the little patch of night.

"No, Marvin, I don't trust God to do a single thing for my children, but I'll cheer you on in anything you try to do for them. That's what mother did when Horatio started out to save the world by nitrogen. She could not bear to make it hard for him in time of battle, and when my boys go to war, I'll say they are doing right."

"Aren't these rather bitter words?"

"No! I'll believe in you, I'll nurse you, I'll go without comforts, I'll love you to death, but when it comes to saving my children from war, you've got to do the thinking."

"Jean, are these the reasons why you kept me waiting for three years?"

"Yes, three years was little enough."

"Shall I release you?"

"No, I'll marry you as soon as you like."

He sat very still, looking out through the resonant trees to that white river of foam and passion. He was silent for ages, and she thought him weighing her fate. At last he spoke.

"Darling, it has just occurred to me that there must be another isotope of osmium."

"I'll bet," she smiled, "that there is."

He was silent again for another age.

"Darling, why should one uranium live six million years while another lives only two?"

She looked at him with roguish eyes.

"I don't know. Let's go and ask father."





